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USSR REPORT

CHEMISTRY

No. 67

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DYNAMICS OF ADSORPTION OF ONE SUBSTANCE FOR NON-LINEAR ISOTHERMS IN THE CASE OF A CLOSED ISOLATED SYSTEM. II. EXTERNAL DIFFUSION KINETICS AND ARBITRARY BROKEN ISOTHERMS OF ADSORPTION

Moscow ZHURNAL FIZICHESKOY KHMII in Russian Vol 53 No 9 Sep 79 pp 2377-2379
manuscript received 16 Jan 79

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[Abstract] Reference is made, at the outset, to a series of three differential equations for a broken adsorption isotherm and external diffusion kinetics. These equations, which are set down, are taken essentially from an earlier paper by Zolotarev (same journal, pp 2374-2376): they describe the balance of mass of a mixture in an adsorption filter; the balance of mass of an adsorbed mixture in a certain volume; and, the kinetics of the adsorption. In the earlier paper a mathematical analysis was made of the general equations of the dynamics of adsorption of one substance in a closed isolated system for arbitrary non-linear isotherms. In the present paper the analysis deals with a fragmented-linear, i.e., an arbitrary broken isotherm. An element of the earlier (Kolin, et al., 1975) equations is $c(t)$ which is the concentration of the adsorbed substance in the adsorption filter and in the space and the authors indicate that the mathematical solution of the task, the expression for $c(t)$, is given by two equations they have derived, for $t \leq t_*$ and $t \geq t_*$. References 3 (Russian).

[24-8586]

CHEMICAL INDUSTRY CONSTRUCTION DELAYS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Oct 79 p 2

[Article by I. Volkov, head of the Section for Organizing Introduction of Developments Into Production, and N. Semykin, senior scientific associate of the VNIPIPAV Institute: "On the Basis of a Unified Plan"]

[Text] We read with interest the article by A. Polyanin in the 6 July issue, "An Intermediary Is Needed." It raised a question of primary importance that has been worrying both production workers and scientific associates for many years: how can the introduction of useful, sometimes highly efficient developments be accelerated?

The Section for Organizing Introduction of Developments Into Production is in its second year of operation at our All-Union Scientific Research and Planning Institute for Surfactants (VNIPIPAV). In its portfolio are over 50 scientific developments, completed and ready for use. It was approximately like this even at the moment when the section was established. All right, has the introduction mechanism been idling for the entire two years? That cannot be said. A number of works have been introduced. The portfolio itself has been supplemented, however! There was no sharp reduction in the projects in progress. This makes one wonder: why?

This is the section that we set up, but have any major steps been taken on the part of production concerning the developments lying on the shelves? Unfortunately, this question must be answered in the negative. The situation is just the same as three, as five years ago.

There are two classes of obstacles: objective and subjective. Included in the first is the rigid production plan, when it is hard to find a "free period" to install new equipment or master a process. Most often this requires shutting down the plant, shop or line. That is, the plan must be corrected (toward its reduction!). No one can be found who wants to appeal once more about this to the All-Union Production Association, ministry or Gosplan. The promising development is put aside or even into the archives. There are many examples. Here are some characteristic ones.

At one of the chemical plants the testing of a sulfonator was nearing the end, and real success was in sight. Certain modifications were required. They were made within the periods specified by the records, but by that time the apparatus had already been dismantled. "We have a plan, and there is no time to bother with you," the comrades said to us.

Similarly, experimental-industrial testing was completed for a new method of sulfuric acid alcohol sulfation at the Shebekino Chemical Plant. The innovation promised a saving of half a million. It was a question of a minor finishing hook-up--a heat exchanger had to be installed. Once again the familiar words about the plan were heard--the obstacle to the innovation.

Or take neonols--the basis for many developments in commercial detergents, including Ektinol, which could replace the preparation, Nordal, purchased for hard currency, at the VAZ [Volkhov Aluminum Plant]. It is the basis of a preparation to rid the sea surface of polluting oil film. Our chemical is greatly superior to the American Keroxite-9527, and moreover, is half the price. We could provide drilling fluids that would raise the gas yield from beds by 15 percent and would reduce the hardness of the rock when drilling blast holes (the yearly economic saving for the Lebedin Mining and Concentrating Combine approaches 290,000 rubles)....

We could also provide many other preparations with exceeding useful properties, if the Salavat Petrochemical Combine would undertake the output of neonols. The directors of this combine, however, stubbornly refuse to organize its production. The motif is the same: "Even without that the plan is overloaded."

The fate of the developments is often determined by a manpower shortage among the construction workers. At the Volgodonsk Chemical Plant imeni 50-Letiya VLKSM a small unit worth less than 25,000 rubles was installed a year late. For the same reason the launching of a very important shop for purified synthetic aliphatic acids has been carried over since 1974, and when it will take place--no one knows. The force of the adverse effect of this factor could be perceptibly reduced if during the technical-economic substantiation of the construction the actual potentials for the construction base were numbered among the basic indicators. This will be the correct conclusion drawn from the lessons nearly always taught by the construction workers.

One more stumbling block is the buyer's (or contractor's) lack of necessary equipment, instruments, etc. They put in what they have on hand. It does not matter that a propellor from a slow-moving air vehicle is put on a supersonic plane. But--they put it on. The idea is discredited, as it was, for example, at the unit mentioned at Volgodonsk.

All of this places a barrier on the path of innovations.

Subjective factors are also fully in operation.

As is known, at times there are quite broad tolerances among the standards for the output. Perhaps a slightly better product will be put out, and perhaps--a slightly worse one. Both are within the limits of the standard. The Shebekino Chemical Plant makes use of this fact when producing synthetic aliphatic acids (they replace natural fats). A long obsolete unit is in operation here for vat distillation of the commercial product that is no longer found at a single related enterprise. The product with inferior consumer properties is sold in accordance with the unified wholesale price, ensuring higher technical-economic indicators than at other enterprises--for the supplier, of course. The same thing can be said of the poor-quality

alpha-olefins of the Novokiybyshev Petroleum Refinery, etc. Does the management of these and certain other enterprises really not know that the national economy has taken a course toward efficiency and quality?

The examples, as is clear to everyone, are on various planes. They have, however, one undoubted common feature: putting into effect scientific (or scientific-design) developments in industry at present is an exclusively voluntary affair. If you want to--put it into operation. If you don't want to--do as you like. For fulfillment of the sales plan, and now--for fulfillment of the agreements with the plant director--there is a strict demand, but there is no such demand for maximum use of the achievements of scientific and technical progress.

The Decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Intensifying the Effect of the Economic Mechanism on Increasing Production Efficiency and Raising Work Quality" ensures the solution to many of the problems of principle in the work of the country's economic organism. Included among them are those relating directly to our topic. For example, the production plans specify putting into effect the achievements of scientific-technical progress and financing them. Provision is made for incentive for the workers of the enterprises, all-union production associations, ministries and departments to introduce new equipment and the output of new commodities, as well as the obligation to include the new developments into the long-term, five-year and yearly plans of the ministries that are the suppliers and consumers under the aegis of the State Scientific and Technical Committee, USSR Gosplan and USSR Gosstroy.

The decree, however, requires that we give thought to working out the details of the economic mechanism being improved. Indeed, the plan for new equipment existed before, as well. The demand for its fulfillment is increasing--this is good. The plan, though, cannot remain as before! After all, it is essentially a mini-plan. It is far from encompassing the developments that scientific and technical thought is offering industry. We feel that the plan for new equipment should be oriented toward maximum use of innovations.

Of course, the plan must not be blown up endlessly. We can suggest a criterion for the minimum: protection of the developments by authorship certificates. It must be done so that all developments of this type must be obligatorily included in the plan for new equipment. Incidentally, the decree too makes it obligatory to give preference to the use of developments protected by authorship certificates, and specifies measures for material incentive.

There is one more step that is necessary, however, so that the innovations do not die on shelves in archives. The plan should be unified, a state plan, on a level with the production plan, obligatory for all the ministries and departments concerned with the production and consumption of the product or item.

With respect to our conditions, the state plan for introduction (we assume that it will be given that precise title) should be a law both for the institute and for the plant, and for the all-union production association and for the ministry. Only planned operations coordinated in this way will lead to success.

[32-12151]

AMMONIA PIPELINE LEG COMPLETED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Oct 79 p 1

[Article by L. Borisov: "Rates and Quality"]

[Text] The southern leg of the pipeline from Gorlovka to Odessa has been successfully filled with liquid ammonia. Today the entire 310 kilometers of the main pipeline were filled with the product. Yesterday the ammonia reached the loading docks.

The construction workers of the Ministry of Construction of Petroleum and Gas Industry Enterprises have performed a large amount of construction and installation work in the Donbass and the Dnepr region. Dozens of obstacles have been successfully overcome: river, railroad and highway crossings have been constructed. The true culmination of engineering ideas is the guy-rope bridging of the Dnepr. It is about one kilometer long. About 12 special cables secure the bridge above the river channel. It was built in seven months--twice as fast as was planned. The brigades of Honored Construction Worker of the RSFSR from the Soyuzmontazhgaz Trust Mikhail Sukharev and of Aleksandr Gavrilin distinguished themselves in erecting the 300-ton pillars, 80 meters high.

High work quality and concern for the reliability of the structure and safety measures when transporting corrosive substances such as ammonia accompanied the high construction rates. The main pipeline at the Dnepr bridge crossing is enclosed in a sturdy casing, into which nitrogen was injected in advance. At the slightest leakage of ammonia (which is virtually excluded) it immediately reacts with the nitrogen and forms a volatile gas--there is no pollution of the river.

A complex automated system is in operation to protect the environment. Reliable instruments have been installed at the pumping stations that transport the product under high pressure to the Grigor'yev liman near Odessa, where the port plant structures have been constructed.

The new main pipeline will be a great help in increasing the efficiency of Ukrainian agriculture. The eight distribution stations constructed along the route traced by the ammonia will deliver valuable fertilizer to the fields of Dnepropetrovskaya, Nikolayevskaya, Khersonskaya and Odesskaya oblasts. In the future the number of these stations will increase to 29. They will provide for the agricultural land resources of Kuybyshevskaya, Saratovskaya, Voronezhskaya, Tambovskaya, Belgorodskaya and Khar'kovskaya oblasts. With the completion of construction of the ammonia pipeline from Tol'yatti to Odessa, in all, the kolkhozes and sovkhozes of the two republics will receive an amount of liquid ammonia that is equivalent to an additional supply of one million tons of nitrogen fertilizers a year.

The first results of the fruitful international collaboration are at hand. The construction project, as is known, is being carried out on the basis of a compensatory agreement with American and French firms, which supply us with equipment and pipes, and in return will obtain the finished product.

The total length of the ammonia pipeline will be over 2,500 kilometers. Right now the work front has been moved forward on its northeastern limb from Tol'yatti to Panyutino. About 900 kilometers of main pipeline have already been welded into the line here. The Ministry of Construction of Petroleum and Gas Industry Enterprises and the Ministry of the Chemical Industry recently adopted measures to accelerate the work rates. Eight comprehensive mechanized flow lines have been sent to the line in addition. This will make it possible to prepare the 540 kilometers of the main section for filling with liquid ammonia before the end of the year.

The Soyuzpodvodgazstroy collective has developed socialist competition to complete the crossings of the Volga-Uzen' rivers and canal ahead of schedule. The underwater construction workers will accomplish the speeded crossing of these obstacles in the near future. Also included in the "workers' relay race" are the collectives of the Mosgazprovodstroy, Lengazspetsstroy and Shchekingazstroy trusts, a number of Ukrainian trusts and the Soyuzintegazstroy Association. The decision has been made to organize a high-speed, expanded assembly of the so-called sectioning posts, in order to run them into the main line by this month. More rigid schedules are being maintained for the installation and mounting of the electric modules and booster stations of the connection.

[32-12151]

12151

CSO: 1841

WEAK NITRIC ACID FIRST MADE AT PRIDONSKOY CHEMICAL PLANT

Moscow STROITEL'NAYA GAZETA in Russian 15 Aug 79 p 1

[Article by A. Dzhiyev: "Competition of Workers in 60 Republics, Krays, Oblasts and Cities--First Tons"]

[Text] The past Sunday the first tons of weak nitric acid were produced at the the first stage of the Pridonskoy Chemical Plant. In short order this chemical enterprise sprang up on the outskirts of Rossosh'--a small town verdantly endowed, in Voronezhskaya Oblast. From a long way off can be seen the enormous granulation tower, the columns, the equipment. Stretching for kilometer after kilometer were the trestles of intershop process feed pipelines.

"To build this enterprise," we are told by V. Lomtev, chief of the start-up complex and assistant head of the Voronezh Territorial Construction Administration, "we specially set up a general contracting trust Pridonkhimstroy. Construction and installation work followed a combined schedule. A commitment--to hand over the work front on time to the next workers in line--was singled out as the key point in the integrated competition under the 'Workers' Relay Race.' Installers and workers in other specialized organizations were involved in the effort, not waiting for a hundred-percent construction readiness of the project. So the machinery in the weak nitric acid shop was installed in the building when the incomplete operations registered "zero." The boiler installation of the heat and electric power plant was assembled before there was even the frame of a building. The construction grounds were hooked up to electric power and water on time."

We move on to the ammonium nitrate shop. Here D. Dodukalo's brigade from the Rossosh' Installation Administration of the Yugovostoktekhmontazh Trust assembled the process piping of the ammonium nitrate solution department. At the height of construction this collective struck out with the initiative of stepping up competition for shortening the work schedules at the start-up projects. Models of selfless labor were exhibited by the bricklayers' brigade of L. Rysnyanskaya and the plasterers and painters' brigade of Ye. Sergiyenko.

Numerous innovative working methods were applied in constructing the first start-up complex of the plant.

"Spherical tanks in the liquid ammonia receiving storage area were installed for the first time without a manipulator--on a water cushion," I. Shpital'nik, chief engineer, Yugovostoktekhmontazh Trust, tells us. "Water became a kind of temporary stand on which the enormous 'ball' was easily rotated for its sections to be welded. This halved their assembly time, and with a smaller number of workers. The absorption column was assembled ahead of time while lying flat on the ground and then lifted as a whole to the design position."

The Pridonskoy Chemical Plant is an all-union shock-priority Komsomol project. Erection of the plant was under the constant scrutiny and monitoring of the Voronezh Obkom. Helping the builders were the workers of many industrial enterprises of the city and the oblast. Detachments of "Korchaginets" Komsomol members were dispatched to the most critical sections.

Ammonium nitrate--a valuable fertilizer for the fields--will be produced at the new plant in a few days.

[16-10123]

DOROGOBUZH AMMONIUM NITRATE, WEAK NITRIC ACID UNITS POSTPONED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Sep 79 p 1

[Article by M. Ziborov: "They Fell Back in a Hurry"]

[Text] "Hardly worth it, writing about these projects. We've chalked them up a long time ago," said A. Volkov, head of the Main Industry Administration for Chemistry, USSR Ministry of Construction.

He is talking about this year's start-up projects--the second installations of ammonium nitrate and weak nitric acid at the Dorogobuzh Nitrogen Fertilizer Plant.

"We should now be making even ammonia faster. What has even gone uncommissioned even from last year," added A. Volkov.

Stal'konstruktsiya Trust Director M. Kolesnik had the same opinion. The job of his subdivisions, he believes, is to make operational as much equipment at the scheduled start-up complexes as possible; but the actual start-ups are really out of the question. Even if strenuous forced-paced work goes on in two or three shifts, the effort will come to a standstill because of the absence of equipment.

"And at least six months will be used up in installing and adjusting the equipment," Tsentrtekhmontazh chief engineer Yu. Rivkin amplifies.

And, finally, the view of the director of the Dorogobuzhkhimstroy General Contracting Trust, M. Novoseletskiy:

"We have to add about 500 new people for our current annual program. It's the shortage of personnel that forced us to hold up the commissioning of the ammonia facility and that delay led to a further setback."

But this kind of arguing is dubious. That conclusion became clear after many talks with the directors of construction and installation organizations and industrial customer representatives. The real reason behind the setback in ammonia facility operations is the lax engineering preparations for the project. By regulations, all underground utilities must be made and the grounds must be prepared and cleared up before installation work steps up. But in this case everything went the other way. High-priced imported equipment was assembled in mud. Foundations were not gotten ready in time for the supports; because of this, serious difficulties cropped up in tying down the furnaces. A great deal needed to be redone.

I met with one of the best brigade leaders, V. Kudlov.

"We're working at full tilt. Foul-ups are coming up all the time. They gave us a crane to install structural members, but they never transferred a KrAZ truck to us. And another time it was the other way around: they delivered the structural members--but no crane. What resulted was that instead of ten days, we are installing the project in about a month."

Other facts bear out the conclusion that worker shortage alone cannot explain the setback in construction. Last year the actual labor force in Dorogobuzhkhimstroy per million rubles of construction and installation work was even higher than the planned valued. But the program was still not carried through. Why so? Because labor productivity went down 6.5 percent. So a way out has to be found not in bringing in more workers, but in raising their labor productivity. On top of this, the personnel shortage grew largely due to the fault of the trust supervisors. Personnel could be drawn and consolidated by giving them good living conditions. But Dorogobuzhkhimstroy's housing construction plan perennially falls through.

"We can't take on people for housing," argues comrade Novoseletskiy. "If we did, the schedule for the main construction would suffer."

The trust director pulled a fast one by claiming that they "can't take on people." To be more precise, they failed to try. On the contrary, workers from a construction administration set up specifically to put up apartment houses were transferred to erect the projects.

The trust itself cut back on tree boughs and on shipments of prefabricated reinforced concrete. About 15,000 cubic meters was required last year by the construction project and just half was shipped in. The plant making reinforced-concrete products was placed in service in a great state of incompleteness and that is why it has failed to reach the design capacity.

The ministry tried to justify its attitude to the Dorogobuzh start-up complexes like this: you see, the question about carrying over the start-up

date to next year has been settled in the USSR Gosplan. But the exact opposite was asserted by I. Barskiy, deputy head of the chemical industry in Gosplan: nobody has lifted their scheduled start-up projects from the Dorogobuzh builders. That makes sense--next year at the Dorogobuzh Plant a catalyst-making factory is to be placed in service, most important for the whole mineral fertilizer industry; one more year--a nitroammophoska facility. Then--a new facility making ammonia, carbamide, argon....

Clearly, we see that with such a tight program there will be a transfer of start-up schedules to the year to come. Chalking up current start-up projects is impermissible also for the reason that the internal reserves of the construction organizations are far from fully tapped.

[16-10123]

SECOND AMMOPHOS COMPLEX ON-STREAM AT VOSKRESENSK PLANT

Moscow STROITEL'NAYA GAZETA in Russian 15 Aug 79 p 1

[Article by V. Bebko: "Voskresensk Cooperation"]

[Text] On 11 Aug the second complex producing ammophos at the Voskresensk Minudobreniye Association went on stream in Voskresensk, thanks to subdivisions of the Ministry of Installation and Special Construction USSR and the Ministry of the Chemical Industry.

On the eve of this labor holiday two more joyous reports came to Voskresensk. To a large group of designers, builders and ammophos production equipment operators (first complex) was awarded a bonus of the USSR Council of Ministers for 1979. Among the laureates are the brigade leaders A. Knyazev and V. Bashkin, V. Kotov, trust head, and V. Zarubin, section head. Another group of workers was awarded orders and medals for the successes scored in constructing and bringing to operational level the capacities of sulfuric acid production.

Everyone involved in constructing the ammophos production complex had to overcome difficulties in good measure. In fact the operations had to be carried out while production was already going on. So a clear-cut interaction among builders, installers and designers took on special importance. They oriented themselves toward the maximum combination of all construction and installation work. To take an example: engaged at the same time in the main building were subdivisions of Stal'konstruktsiya and Trust No 7 of the Ministry of Installation and Special Construction and Trust No 5. The first-named group installed the building's skeleton, the second--its equipment, while the third did general construction work. Yu. Klimakov's brigade

coped masterfully with the installation of the special-purpose drying drums. Through its mastery and strenuous exertions, all the subcontractors were handed the work front on time.

Collaboration went off well between builders, installers, adjusters and equipment operators. The chemical workers built up experience in functioning during start-up adjustments and, thus, long before start-up they began readying for this goal--bring the design capacities up to operational level on shortened schedules. So the day the complex came on stream the ribbon did not have to be cut in front of the central control panel in Shop No 2; there was no need to track how the first production came off.

For the Moscow area builders the construction grounds in Voskresensk turned into a proving-grounds for advanced construction experience. Employed here were not just innovations in technology, but also effective forms of socialist competition: under the "Workers' Relay-Race" principle and under the motto "Work Without Lag-Behinds."

[16-10123]

THREE RUSTAVA CHEMICAL PLANT SHOPS AIM AT ADVANCE START-UPS

Tbilisi ZARYA VOSTOKA in Russian 18 Aug 79 p 2

[Article by N. Kvizhinadze: "Birth of a Giant"]

[Text] Reconstruction of the Rustava Chemical Plant is picking up speed. The prime target of builders and installers is to put three start-up projects into service ahead of schedule: the ammonia shop, the weak nitric acid shop and the ammonium nitrate shop.

We are driving along verdant plant avenues. Some minutes go by and ahead of us loom the new construction sites. "Like it?" Plant party committee secretary D. Rukhadze wipes sweat off his brow. "You haven't yet seen our sights--the ammonia shop. Here is where the real beauty is. Admittedly, austere, but genuine...." We pull up to the final destination--the headquarters for the reconstruction of the Rustava Chemical Plant, all the while Dzhoni Kalistratovich talks about this giant project with some pride.

The work front stretched over an area of 28.9 hectares. About 2000 builders and installers are actually putting up a new plant in a plant. This new plant will be made up of well-lit spacious production buildings with the most modern equipment and with innovative technology and intelligent and high-productivity automatic units. Enterprise capacities will nearly double.

Challenges that are awesome in scope confront the general contractor--Zakavkazmetallurgstroy Trust No 1 of the republic's Ministry of Construction and subcontracting organizations. Construction and installation work valued at 26 million rubles needs to be done; 116 kilometers of pipelines have to be laid; and 42 kilometers of power transmission lines have to be strung. Much has already been done today. Right now prime builders attention is riveted on the start-up projects. The target is high and hard to reach: by early November ammonium nitrate and nitric acid production facilities are to be placed on stream and by the first of December--the ammonia facility. But here people believe in victory, by stepping up the pace of operations day after day.

We stop at the ammonia production complex. Here equipment installation is going on at full steam; construction operations are winding up. Stage one of a shop with a 200,000 tons a year product capacity is being readied for start-up adjustments. We meet T. Kardanakhishvili, chief of the project under construction. He tells us:

"The most critical time has come for us. We have to manage within very tight schedules. Work has been organized in two shifts; in the most critical sections--in three. Installers are handling one-and-a-half to two norms a day."

Workers from the Nizhnekamsk Heat-Installation Administration are engaged in installing the main primary reforming equipment. This job is not a simple one--installing equipment designed to operate at pressure to 350 atmospheres and at temperatures to 1000 degrees. The Nizhnekamskites are not experimenting--reliability is guaranteed.

And next-door, in the building of the plant reconstruction headquarters, telephones ring without letup; department and service personnel scurry in corridors: schedules are being updated; the state of affairs in the projects of the construction site's coordinating center is under continuous analysis. Holding an operational conference in one of the rooms is the headquarters chief, the director of Zakavkazmetallurgstroy Trust No 1, K. Gogichaishvili. The conversation is laconic, about the essentials. Questions brought up are resolved in short order. Production subdivision directors enter the changes in their notebooks; there too they correct the day's program in strict accord with the task posed. They are envoys from different cities across the country--Kaliningrad and Voronezh, Leningrad and Baku, Batumi and Tiraspol'; they arrived here to help the workers of the republic in constructing the biggest chemical enterprise of the Transcaucasus.

The plant tour winds up. Karl Vladimirovich willingly agrees to explain the situation in the construction grounds.

Something like 13 million rubles was to be spent this year in construction and assembly. More than half this amount was used up in seven months. Subcontractors take stock: the project was supplied with specialists at the same time while installation work here comes to more than 50 percent of the whole volume. In fact, even the industrial customer is not at his peak--process equipment was not supplied the construction project on time. The trust, too, has overlooked much. But the lag will be made good in the shortest time. What is most labor-intensive--readying the work front--is already in the past. July was when the state plan was met; in August it will be considerably overfulfilled.

"Thirty-three construction-installation organizations are working on plant reconstruction," continues K. Gogichaishvili, "three transportation organizations and two mechanization administrations. This is a large force and managing it is complicated. Foul-ups have happened. We try not to repeat mistakes. Even the subcontractors themselves soberly evaluate the state of affairs. Lately they have noticeably quickened their pace. Good demonstrations have come from personnel in the Rustava section of Promventilyatsiya, the Rustava administration of the Gruzelektromontazh Trust and other organizations. The collectives of the construction administrations No 3 and No 8 are stand-outs.

We set out to backtrack our steps. On the way we catch the attention of D. Rukhadze: is the enterprise ready to accept new shops? Here's what he answered:

"Right now to Severodonetsk and Cherkassy, where special teaching centers are functioning in our specialization, we've sent two groups of young workers. Soon they'll be coming back and will participate in start-up adjustments so that in the future they'll be heading the most responsible sections of the facilities brought on stream. Not long ago the party committee passed a resolution on organizing in the new shops primary party organizations, to be given over completely to personnel affairs. These and other actions enable us to bring up the introduced capacities to design level on the shortest schedules."

[16-10123]

CSO: 1841

ODESSA PORT AREA PLANT, SECOND STAGE, BEATS START-UP TIME

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Sep 79 p 1

[Article by A. Dzhiyev, correspondent, press center of the USSR Ministry of Installation and Special Construction: "Beating the Clock--Second Stage of Giant Plant Goes into Service"]

[Text] Late last year the builders, installers and equipment operators of the Odessa Port Area Plant wound up construction and placed on stream ahead of schedule ammonia facilities that have a capacity of 450,000 tons a year, along with mechanized complexes for loading chemical products. In congratulating the many-thousands-strong collective on its great laboring triumph, Leonid Il'ich Brezhnev, General Secretary of the CPSU CC and Chairman of the Presidium of the Supreme Soviet, then wrote what follows in a letter of greetings: "I express my firm certainty that you will staunchly battle in the future also for the advance commissioning of second-stage projects and for bringing the capacities of the Odessa Port Area Plant up to design levels. . . ."

. . . And here we are on the bank of the estuary where, several tens of kilometers from Odessa, the second stage of the giant plant went up in record time. This unprecedented chemical complex was erected by the Chernomorgid-rostroy, Odeskhimstroy and Chernomorpromsantekhmontazh trusts and many other construction and installation organizations. During several days before the start-up at the republic Komsomol shock-priority construction site socialist competition was gotten underway for the right to hand over, ahead of schedule, the symbolic key from the enterprise second stage to the equipment operators. Dozens of brigades labored with high spirits. But the best of all were the installers' collectives led by N. Kotoniy and I. Sherstyak. During the installing of the compressors they also completed some of the start-up adjustment work--they centered the piping and the pumping installations. As a result, they finished assembling the compressors four months faster than at the first ammonia facility.

The unitwise method of construction became one among the main factors behind the accelerated start-up of the high-tonnage installation on schedules as condensed as these schedules.

This method lent itself to broad possibilities in organizing rapid installation. To illustrate: the multiton roofs of the giant cylindrical stores of chemical products were assembled in advance at the bottom of tanks and then raised with water and compressed air. The operation took just half an hour.

"While we did eight percent of the total volume of installation work each month when we were putting up the first installation, this indicator was brought to 12 percent for the second installation," says D. Turbanov, head of the Odessa Specialized Administration No 532 of the Chernomorpromsantekhmontazh Trust.

Particular mention must be made of the fact that the builders not only shortened the schedules, but also thereby economized good amounts of material: cement--nearly 3000 tons, reinforcements--1400 tons; and the total economic benefit from the rationalizers' suggestions was more than 1.1 million rubles.

The second installation is going into service; a handful of days remained before the start-up of the mechanized complexes loading chemical products. Builders and installers have kept their word: they have brought the start-up of a most important national-economic project three and a half months closer.

[16-10123]

SOLIGORSK'S FOURTH POTASSIUM PLANT ADDS SECOND CHLORIDE LINE

Minsk SOVETSKAYA BELORUSSIYA in Russian 1 Sep 79 p 1

[Article by V. Prikhod'ko, BELTA correspondent: "Threshold to the Second Million: Transformations Wrought by Five-Year Plan"]

[Text] Installation of the equipment in the second process line making high-grade crystalline potassium chloride in a beneficiation plant was completed as part of the construction of the Fourth Potassium Plant in Soligorsk.

Crowded now are the trains heading to the Fourth Potassium Plant: it began the year with initial output and is quickly gaining strength. Miners and builders hurry to work in comfortable railroad cars. Both miners and builders have strenuous work schedules. The miners are competing for the right to start the records going on the second million ton of the "stone of fertility" since operations began. As for the builders, they are stepping up the pace of erecting the second stage of the giant plant: its start-up is projected for year's end. When it is brought up to operational capacity, the enterprise capacity will come to 3.5 million tons. This will enable Belorussian potassium industry workers to bring product output up to the volume provided for in the "Guidelines for the Growth of the USSR National Economy for 1976-1990."

In many ways the enterprise stands out over its predecessors. In it has been installed the most up-to-date domestic equipment. Here fertilizers are extracted, for the first time in the country, from ores by an innovative halurpic method. The product yielded by this method stands out for its high quality--the content of active principle in it was brought to the most stringent world standards.

In bringing the new production lines up to design capacity, the Soligorsk workers are stubbornly battling to boost product output at the operating mine administrations. They all are now in reconstruction.

"Since the first of the five-year plan period we have shipped users an extra million tons of 'fertility vitamins' beyond the plan," said G. M. Serenko, assistant to the general manager of the Beloruskaliy Association. "This amount could have been bigger. But the late delivery of rail cars for shipments is severely dragging down the buildup of production volumes. About 200,000 tons of fertilizers, impatiently awaited by farmers, has piled up in the warehouses."

[16-10123]

MODERNIZING ALMALYK CHEMICAL PLANT ADDS AMMOPHOS CAPACITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Sep 79 p 1

[Article by Ye. Taubenshlag, TASS correspondent: "On Communists' Initiative"]

[Text] Without enlarging its production space the Almalyk Chemical Plant is adding to its capacity. A gain in product output equal to commissioning the additional fourth stage of the enterprise will come from reconstruction that has begun in the shops.

The reconstruction is thorough-going, though the plant is a newcomer: mineral fertilizer began to be produced here some ten years ago.

"Science, advanced experience during this time discovered new possibilities," said K. Sadykov, plant manager; "all we need to do is compare the first shops of our enterprise with the shops recently placed in service. Numerous installations, instruments and equipment with which the new shops are provided embody the thinking of plant rationalizers and inventors. In collaboration

with the scientists, it was possible to resolve the problem of first-rank importance: to set up the production of concentrated nitrogen-phosphorus fertilizers from the lean ores of the Karatauskoye deposit. Today nearly all Almalyk ammophos is of the highest grade; in it the phosphorus and the nitrogen are at content levels higher than assumed.

The deductions from it make a weighty contribution to the enterprise funds. And even the state is quick to direct funds for expansion and equipping of the plant: here each ruble of capital investment brings in a fast return.

Here are characteristic features of the plant's biography: all three stages were started up ahead of time; each of them was brought to the rated capacity ahead of schedule. This way additional hundreds of thousands of tons of valuable mineral fertilizers were realized.

Emphasized in a resolution of the CPSU CC and the USSR Council of Ministers, "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Higher Production Efficiency and Product Quality," was that modernizing existing enterprises is one of the paramount ways of achieving growth. It is precisely this way that was chosen by the collective on the initiative of the plant's communists.

The reconstruction plans were drawn up with reference to the advanced experience--of the enterprise proper and allied enterprises; also considered were the recommendations of scientific institutes and design offices. The schedule provides for replacing obsolescent equipment with new equipment--on the planned-repair days. Entire process lines are being modernized. Calculations confirmed the following: reconstruction will up ammonia output a third--this then is an increment tantamount to commissioning one more plant stage. But this effort will prove to be severalfold cheaper than constructing and installing new shops; and the return on the capital investment will occur somewhat sooner--as soon as 1980.

Will the collective of workers and engineers then manage with the swelling production volume? Yes--is what they believe at the enterprise. Labor productivity will climb not through outlays of physical labor: hundreds of chemical workers will learn to work with more advanced equipment. In just the last year every other worker advanced a work grade and mastered a related occupation.

[16-10123]

CSO: 1841

CHEMICAL PLANT AT VORONEZH

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Oct 79 p 1

[Article by M. Seredin: "The Plant Has Begun To Live"]

[Text] The workers in the fields of the Central Chernozem region have long awaited the operational start of this plant, which has sprawled out in the south of Voronezhskaya Oblast. Now the priority complex of the Don region chemical industry, which, after achieving the planned level, will produce 765,000 tons of ammonium nitrate and 30,000 tons of dilute nitric acid each year, has been put into operation.

The construction workers of the Voronezh Territorial Administration and the installation workers of the USSR Ministry of Installation and Special Construction Work have contributed a great deal of work to establishing the new capacity. A solid program of construction and installation work was fulfilled.

... The ammonium nitrate shop. Strictly speaking, the word shop is quite arbitrary in this case. As V. Druzhinin, chief of the shop, said, it includes nine wings standing in a row, each of which performs its own industrial processes. This whole complex production facility is controlled by an operator from a central control panel. The installation of the industrial equipment in this shop, just as in the others, was successfully performed by the Yugovostoktekhmontazh Trust. Large amounts of work at the Don Chemical Plant fell to the share of collectives of the specialized Yugovostokstal'konstruktsiya and Yugovostokelektromontazh trusts of the Voronezh Territorial Administration. Many of the competitors were famous for high labor accomplishments. For example, the brigade of communist labor of steeple-jack installation workers, headed by communist Ye. Karpeyev, organized its work on the basis of brigade contracting and introduced consolidated assembly of metal structures. Due to this, the periods for installing the large wing of the heat-recovery central heating and power plant was cut almost in half. Brigade members V. Shabalin and A. Vishnyakov, of the brigade of installation workers of V. Pozhidayev, the brigade of carpenter-concrete workers of S. Gurevich and many others worked on a shock work schedule. The close collaboration of the participants in the construction project based on the "workers' relay race" of associated workers contributed to the success.

The detachment of volunteer workers--envoys from the Voronezh enterprises--left fond memories at the construction project.

The new plant is beautiful. Its tall buildings, between which asphalt roads and sidewalks extend and the industrial pipelines, painted silver, delight the eye. All the necessary everyday conditions are being created for the workers at the plant. Two microrayons are being constructed at Rossoshi which include multi-story, well-appointed apartment houses, buildings for cultural-everyday purposes and trade enterprises.
[35-12151]

CHEMICAL PLANT AT RUSTAV

Tbilisi ZARYA VOSTICKA in Russian 28 Aug 79 p 1

[Article by V. Kremer: "A Construction Project of Particular Importance"]

[Text] The leader of Georgia's great chemistry--the Rustav Chemical Plant--is being rejuvenated. The enterprise is being renovated, its shops are being modernized, new, extremely improved equipment is being put into operation and the main thing, increasingly newer production facilities with great national economic importance are being put into operation. This year alone 26 million rubles should be expended for construction and installation work--considerably more than was spent for the construction of the first sections of the enterprise.

This year there should be put into operation complexes of shops for ammonia production with a yearly capacity of 200,000 tons, for dilute nitric acid--372,000 tons, and for ammonium nitrate--450,000 tons a year. This is almost twice as much as has been produced up to now. The construction and installation workers have given their word to complete all the jobs at a high level and this year to put them into operation ahead of schedule.

The whole country is helping to erect the facilities for the great chemistry industry in Rustav. The equipment is received from Moscow, Kaliningrad, Volgograd, Khabarovsk, Tula, Cherepovets and many other cities. Up to 2,000 persons are employed today at the construction projects underway. Here too are many envoys from our republic and the fraternal republics of the country. The staff set up for the construction and the party groups are sustaining a high degree of enthusiasm and working mood in the masses and are performing purposeful work to eliminate lagging behind at certain sections.

Comrades E. A. Shevardnadze, P. G. Gilashvili, G. V. Kolbin, Z. A. Pataridze and Z. A. Chkheidze visited the construction site of the underway projects at the Rustav Chemical Plant on 27 August. Along with them were Yu. I. Kedishvili, deputy chairman of the Georgian SSR Council of Ministers, V. I. Karumidze, chief of the Division of Propaganda and Agitation of the Georgian Communist Party Central Committee, V. Z. Barsukov, head of the Industrial-Transport Division of the Georgian Communist Party Central Committee and R. A. Dzhaparidze, chairman of the Georgian SSR State Committee.

They examined the shops, columns, cooling towers, scaffolds and other complex engineering-technical structures of the underway complex and the workers' dining halls, trade complex, sports campus and cultural-everyday facilities for the Rustav chemists that are under construction.

The explanations were given by K. V. Gogichayshvili, director of Trust No 1 of the Georgian SSR Ministry of Construction, A. A. Avetisov, chief of the Gruzmontazhspetsstroy Administration, and G. T. Gogoladze, director of the chemical plant, who are supervising the city's party and Soviet workers.

At a conference held at the plant it was noted that in the last few months a great deal of work had been done at the construction project to overcome the lagging behind. The plans are as a rule being fulfilled. The technical-economic indicators have improved. This progress has been achieved as the result of the great amount of purposeful organizational and party-political work, a considerable improvement in the management of the economic affairs and widescale development of socialist competition.

The participants in the conference also pointed out individual shortcomings. They have to do mainly with the behind-schedule supply of equipment, individual grades of pipes, refractory materials, construction timber and pre-cast reinforced concrete. In connection with putting new production capacities into operation there must be an intensification of attention paid to problems of training skilled personnel for the plant, creating all the conditions for improving the material well-being of the workers and putting into effect all the items of the plan for social development of the enterprise's collective.

The press, radio and television should daily monitor the course of the construction and installation work, bring into the spotlight the heroic work-days of the construction, installation and operations workers, organize social stations at the projects under construction and regularly inform the readers and listeners on the state of affairs.

The results of the conference were summed up by Comrade E. A. Shevardnadze, candidate-member of the CPSU Central Committee Politburo and first secretary of the Georgian Communist Party Central Committee.

[35-12151]

CSO: 1841

PAINT PLANT AT YAROSLAVL'

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Oct 79 p 2

[Article by V. Kremer: "A Department That Looks Ahead"]

[Text] In the decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism, including measures for a further increase in social production efficiency, a prominent place is allotted to modernizing and technical reequipping of existing enterprises. Worthy of attention in this connection is the experience of the Yaroslavl Lakokraska Association of the Ministry of the Chemical Industry, where an engineering department for long-range development has been established, and is operating successfully.

Rita Semenova, a laboratory worker in the epoxy resin shop, poured a small handful of reddish brown powder into the palm of my hand.

"Is this a component of your new product?" I ask.

"Your are wrong, it is paint ready for use! I can show you how it is done."

She fastened a small plate in the testing chamber, pointed a paint spray gun at it and pressed the trigger. The chamber was immediately filled with a reddish cloud....

Then I discerned a metal rectangle, still warm from the drying apparatus, covered on one side with an even coat of paint. No matter how hard I looked, not the slightest crack, not the least pinch of powder was perceptible on the shiny, glasslike surface. Just to be certain, I scratched it with my fingernail--no effect.

"Have no doubts," smiled Rita. "We guarantee the quality!"

Putting into production the first industrial process in the country for obtaining powdered epoxy paints is one of the most recent pieces of work of the department for long-range development of the Yaroslavl' Lakokraska Production Association. It all began this way....

The system in principle for obtaining a powder able to compete with the long customary liquid paint was worked out at the head institute of the paint and varnish industry. The scientists suggested that the Yaroslavl' workers test the new process. An experimental test unit thus appeared in Shop No 7.

It had scarcely issued the first tons of the product when the consumers jumped at it. It would be surprising not to jump at it! The process of applying powdered paint using the method of spraying in an electric field is relatively simple, and lends itself easily to automation. The coating meets the most rigid requirements. Moreover, ordinary paint is half solvents--essentially ballast. Here, however, you have nothing superfluous, a 100-percent pure paint substance! The economic effect from using each ton of powders is about 3,000 rubles.

In general, it rapidly became clear to everyone: mass production must be set up. How should events develop now?

The traditional pattern is well known. First the technical-economic assignment to construct the industrial unit is drawn up. Then the planning documentation is worked out, orders are distributed for the equipment, a construction contracting organization is found.... In a word, a cumbersome and, alas, often even wheel-spinning mechanism must be put into operation, called upon to ensure the advance of the innovation from sample to series.

The Yaroslavl' chemists did not take this route.

"Leave us the test unit," they said, "and we ourselves will turn it into a large-tonnage unit."

"But how about the designing, the nonstandard equipment? It is still no joke--the first such production facility in the USSR!"

"Our long-range development department will take care of all that...."

Without going into the technical details, we will tell about the result. In accordance with the most careful estimates, the renovation cost half as much and was carried out twice as quickly as new construction. A seven-story steel machine arose at the site chosen for the living thread of the experimental unit. The output of powdered paint of five grades was mastered. The principal buyers of the powders were the Volkhov Aluminum Plant and enterprises of the pipe and electrical equipment industry.

"By the end of the five-year plan we estimate increasing the powder output 1.5-fold at minimum," says Pavel Iosifovich Kestel'man, chief technologist of the association, when showing me the new production facility. "Even today we could yield considerably more, if there were no trouble with the raw material...."

Here, perhaps, is the very place to explain what, strictly speaking, the long-range service is. Gennadiy Grigor'yevich Bobrov, director of the association, began from way back:

"The logic of scientific-technical progress is such that an enterprise, even one that is doing outstanding work, cannot stay in place and put out the same products for years. Particularly in such a dynamic sector as chemistry. New types of raw materials appear, improved production processes are designed, the demands of the numerous consumers change.... Here, then, the objective need for constant updating comes into conflict with the fully natural attempt of people to retain what has already been set up and tested, what makes it possible to fulfill the plan without special expenditures of nervous energy.

"Where, then, is the way out?" Bobrov paused. "Specialists in the theory of administration in such cases say: each one must carry his own suitcase. This is the principle that we have taken as the basis in establishing the department for long-range development. Only those who work directly for the plan have been left in the shops. As fine a line as possible has been drawn between those who should ensure the efficient administration of the production and those to whom it has been proposed to look ahead, to think of its further development. The latter were chosen under the guidance of the chief engineer. Incidentally, in accordance with the official instructions, at our enterprise he is freed from solving regular daily problems. For this we have a deputy director of production."

Today almost half of the association's engineering corps is employed in the long-range department. It includes a central plant laboratory provided with the newest equipment (any institute can envy it!), and the sections of the chief technologist, planning-design and standardization. The work is carried out in accordance with a five-year plan. The main directions are improving the existing industrial processes, developing new grades of products and advanced technology, and comprehensive mechanization and automation of labor-intensive operations.

These figures will make it possible to judge the scale. In 3 1/2 years, 8 mechanized flow lines and the same number of advanced industrial processes have been put into operation, and 16 new grades of products have been developed. Over 400 major measures have been recorded in the five-year plan for technical development. The yearly economic effect from the ones that have already been put into operation was 8.4 million rubles.

Here it must be noted that the Yaroslavl' association is not among those modern giants of industry to which a substantial share of its own variegated products is supplied. It was formed as the result of the merging of two small paint and varnish plants, the history of which began as far back as the last century. Nevertheless, the level of labor mechanization here is the highest in the subsector. In the last three years the production volume has increased by almost 30 million rubles, with all the increase provided through the modernization and technical reequipment.

"I don't want you to form a false impression," continued Gennadiy Grigor'yevich. "A sheer creative "holiday," as they say, is one thing, and a perpetual race for the plan is another. To make a clearcut dividing line by no means signifies a blind wall. On the contrary, the long-range department is developing and introducing its innovations with the active participation of other subdivisions and services and shop workers. Otherwise, it simply could not be: our collective is one and the tasks are unified."

The plant researchers are not particularly worried about considerations of priority, and have nothing against "outside" technical ideas. Nor is it so terrible if the idea turns out to be, as they say, unripe. The long-range department will manage to "make sense of it," and to adapt it to the actual conditions of its production. In a word, it will perform the work that is outwardly not very striking, but completely necessary, which the substantial scientific research organizations are not very willing to take up. In all fairness it is worth mentioning that the workers in the department do not only develop outside ideas. Among their active members there are original inventions protected by authorial certificates. They told me, for example, about the primer with increased reliability, created at the request of Kam AZ, which was awarded the State Seal of Quality. Today they are coating the motors of powerful machines with it at Naberezhnyye Chelny.

Gennadiy Samuilovich Ioffe, the association's chief engineer, remarked to me in a conversation, it seemed to me with some resentment, that at the technical council of the head institute the developments pass through more easily than at their own.

"Do they have less confidence in yours?" I asked.

"No, no, that's not it at all, you misunderstood me.... For outside jobs, like it or not, a certain allowance has to be made for the fact that they cannot take into consideration the plant reality in all its complexity. We do not have to rely on such allowances: the new process should be completely ready for industrial use."

Well then, here, obviously, lies the main strength and main advantage of the plant's long-range department. By ensuring a continuous process of production updating, it has become a reliable and effective instrument for accelerating the rates of technical progress at the enterprise.

In its nine years of existence, the engineering department for long-range development has fully proven its right to life. Its establishment requires neither an increase in staff or any other additional expenditures. It would seem that in the light of today's requirements for increased production efficiency, the experience of the Yaroslavl' chemists deserves support and dissemination.

[35-12151]

CSO: 1841

TITANIUM DIOXIDE PRODUCTION CRITICISM ANSWERED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Oct 79 p 2

[Article by Ye. Vlaskin, deputy minister of the Chemical Industry]

[Text] In the article, "Debates at the Departmental Level," published in the newspaper SOTSIALISTICHESKAYA INDUSTRIYA on 17 May of this year, the question is correctly raised of the unsatisfactory state of affairs with respect to the development of a domestic production process for titanium dioxide using the chlorine method.

To solve the problems of planning, constructing and putting into operation a complex for the production of titanium concentrate, the Ministry of the Chemical Industry has drawn in the organizations under its jurisdiction.

An experimental unit for pigmentary titanium dioxide is now being set up at the Yaregskoye deposit.

The Ministry of the Chemical Industry feels that it is necessary for the Ministry of the Petroleum Industry to complete, in the near future, construction of the facilities for the experimental-industrial complex for the production of titanium concentrate, including setting up a unit for obtaining autoclave concentrate.

The problems raised in the article concerning completing the construction of an ore-dressing complex and turning it over to the Ministry of the Chemical Industry should be solved in USSR Gosplan, also enlisting the USSR State Committee on Science and Technology.

On its part, the Ministry of the Chemical Industry will take the necessary measures to solve this problem.

[35-12151]

12151

CSO: 1841

USSR

KIEV PLANT PRODUCES MARINE PAINT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA 25 Nov 79 p 2

[Article by Zh. Tkachenko: "Effective Protection"]

[Text] The Kiev Paint and Lacquer Plant has started to produce polyurethane enamel. It provides dependable protection from corrosion to ship structures, as well as various containers used in the food industry. The first shipment of the new production is consigned for ships in the Azov Sea.

[65-P]

USSR

REGENERATOR-REGULATOR DELIVERED TO NITROGEN FERTILIZER PLANT

Moscow SEL'SKAYA ZHIZN' in Russian 11 Nov 79 p 1

[Article: "For the Fertilizer Plants"]

[Text] Dzerzhinsk. (Gor'kovskaya Oblast). The local chemical machine building plant has delivered a complex regenerator-regulator ahead of schedule to the Tol'yatti Nitrogen-Fertilizer Plant imeni 50th Anniversary of the USSR. The production of this unit has been mastered for the first time by an enterprise in our country.

The Chemical Machine Building Plant delivers production to the Ukraine, the Urals, Central Asia, Siberia, the Far East, and the Baltic. A significant part of the production of the enterprise is intended for chemical plants, especially for the production of mineral fertilizers. Since the beginning of this year, equipment worth about 19 million rubles has been delivered.

Month after month both labor productivity and quality of production are growing.

[62-P]

USSR

**PROCEDURAL QUESTIONS RELATING TO FORECASTING THE DEVELOPMENT OF THE
CHEMICAL AND PETROCHEMICAL INDUSTRY AND THE BUILDING MATERIALS INDUSTRY**

Moscow ZHURNAL VSESoyuznogo Khimicheskogo Obshchestva imeni D.I. Mendeleyeva
in Russian Vol 24 No 4, 1979 pp 388-389

BRAGINSKIY, O. B., Candidate in Economic Sciences, and ZABELESHINSKIY, Yu.
A. Candidate in Economic Sciences

[Abstract] A summary is given of the proceedings of the "Procedural Questions Relating to Forecasting the Development of the Chemical and Petrochemical Industry and Building Materials Industry" conference which convened in October 1978 in Kaunas in the Lithuanian SSR. Subjects of discussion at this conference were the further development of research on forecasting, the generalization of know-how gained in studies on making economic and scientific and technical forecasts, the coordination of research done, and the unification of procedural approaches to the development of forecasts. Taking part in the conference were 100 people. It was organized by the central and Lithuanian republic administrations of the All-Union Chemical Society imeni V. I. Mendeleyev, and by the ministries of the chemical, oil refining and petrochemical industry and the building materials industry, in conjunction with the Scientific Research Institute of Technical and Economic Research and the Kaunas Synthetic Fiber Plant imeni the 50th Anniversary of the October Revolution. The speakers and the topics of their reports are listed. Reports were given on such topics as the methodology of longterm planning and forecasting of the development of a branch of industry, the use of economic statistical models in medium-term forecasting of key indicators for the development of the chemical industry, the forecasting of capital investment in a sub-branch of the chemical industry, forecasting the demand for mineral fertilizers, forecasting the production and utilization of heat insulating materials, and methods used to forecast the development of chemical science and the industry abroad. The conference revealed that subdivisions involved in questions of forecasting have been created in many organizations. These subdivisions are developing procedural approaches to forecasting, making summary forecasts and forecasts for the demand for products, capital investment, and of labor productivity, and are employing various forecasting methods. The results of forecasting research are being transmitted to planning agencies. Deficiencies in forecasting research were also noted, including the lack of unified procedural specifications for forecasts and the low-level development of the forecasting system in automated control systems at different levels of control. Skilled personnel are scarce. Recommendations were made, aimed at increasing the role of pre-plan forecasts and at strengthening the scientific basis for their development. It was recommended that courses on forecasting be included in academic programs.

[39]

ENSURING SAFETY IN THE PRODUCTION OF CHLORINE AND CAUSTIC SODA IN LARGE PLANTS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 327-337

SIMON, A. G., and TIMOFEYEV, A. F.

[Abstract] A history is given of the development of various modern methods used throughout the world for separating a water solution of sodium chloride into chlorine and NaOH. In recent years electrolyzers with a solid cathode and an ion exchange membrane have been used employing the process of membrane electrolysis. This method makes it possible to obtain caustic soda of a high degree of purity. The use of fluorocarbon membranes such as "Nafion" is discussed. An 80-cell membrane electrolyzer developed by the Japanese Asahi Chemical firm is discussed. Ruthenium oxide anodes have begun to replace poor-wearing graphite, both in diaphragm-type and mercury-type electrolyzers. A description is given of the "Glanor" bipolar diaphragm-type electrolyzer with ruthenium oxide anodes, designed for large-scale chlorine production processes. In terms of safety, a major problem in the production of chlorine and caustic soda is the removal of mercury from hydrogen and caustic soda. In spite of some low figures cited for the release of mercury in chlorine production processes, it is felt that the mercury method ought to be replaced by safer methods of producing chlorine and caustic soda. Aspects of safety to be considered in designing new and reconstructing old chlorine plants include taking into account the physicochemical properties of the products of electrolysis, such as the high toxicity of chlorine, the explosion hazard of mixtures of hydrogen and chlorine and hydrogen and air, and the irritating and burning effect of the alkali on the mucous membranes and skin. Dangers in using the process of electrolysis with a mercury cathode include mercury poisoning and the possible electrocution of operating personnel. Since electrolyzers have been increased in unit power, there is the added danger of the increased magnetic field, which necessitates taking measures to protect from magnetic fields the operating personnel and the technological process for the electrolysis of sodium chloride. The main measures for ensuring safety in production with large plants are the following: the total mechanization of production, supplying electrolysis sections with subterranean brine instead of imported solid salt, introducing air cooling, and changes in the method of processing chlorine. Crucial measures to be taken are the automation and remote control of technological processes and the employment of systems for warning and interlocking process equipment with current converters. It is emphasized that the increase in size of plants has been conducive to improving safety because of the reduction in the required number of units. At the brine preparation stage safety is best ensured by the underground cleaning of the brine

from impurities harmful to the production process, such as salts of calcium and magnesium and suspended matter which is insoluble in water. This is done directly in cells for leaching the salt with water. Companies such as Dow Chemical perform this process in leaching wells. The impact had by the design of buildings on the safety of plants is discussed. Safety aspects of the transportation of chlorine in large quantities are discussed, as well as of storing it. Data are given on practices of firms around the world. Data are presented on the effects of chlorine on the human body and a table is shown illustrating the sensitivity of a human being to chlorine as a function of the length of his stay in a contaminated environment. The danger of liquid chlorine leaking from tanks in storage and transportation is discussed, as well as in the transportation of gaseous and liquid chlorine through pipelines. Emphasis is placed on the danger of the release of hydrogen in the production of chlorine. The control of pressure ratios in the diaphragm electrolysis method is discussed. A sketch is shown of a hydraulic gate unit for protecting from sudden fluctuations in pressure in the anode space of electrolyzers, chlorine collectors and equipment for cooling and drying chlorine. A sketch shows a unit for cleaning chlorine from absorbed gases. The corrosive effect of wet chlorine is discussed in terms of resistant materials suitable for the fabrication of equipment and pipelines, such as a glass fiber reinforced polyester resin with a high chlorine content, such as "Hetrion-197" resin. Specifications for coolers for chlorine in production processes are discussed. A sketch is shown of a combined drying column for chlorine. Questions of electrical safety are detailed. Figures 6; references 79: 39 Russian, 40 Western.

[39]

CSO: 1841

QUESTIONS RELATING TO SAFETY PROVISIONS IN POWER AND PROCESS PLANTS FOR THE PRODUCTION OF NITRIC ACID

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 320-326

ZAICHKO, N. D., Candidate in Technical Sciences and Director, GIAP [State Scientific Research and Design Institute of the Nitrogen Industry and Products of Organic Synthesis], and CHERNOMORDIK, L. I., Candidate in Technical Sciences and Chief, GIAP Combined Scientific Research and Planning Division of Chemical Power Technology and Industrial Heat and Power Engineering

[Abstract] At the present time more than half of the dilute nitric acid in the USSR is produced with plants with a capacity of 355 tons/day and operating at a pressure of 7.3 atm. This plant is called the UKL-7 and has been in existence since the middle of the 60's. In the middle of the 70's the AK-72 plants were introduced. The UKL-7 was created by GIAP with the specific purpose of practically totally removing oxides of nitrogen from exhaust gases. The design of the UKL-7 is distinguished by the fact that the chemical processing equipment is placed in series between the compressor group and the gas turbine unit (GTU). The unit's chemical technology is traditional in that it begins with the preparation and mixing of ammonia with air, and is unique in that it ends in a high-temperature unit for removal of oxides of nitrogen from exhaust gases. The initial combustion chamber for the GTU is located in a bypass section of the chemical processing equipment between the compressor group and the gas turbine. This combustion chamber is the chief source or one of the sources of heat for the GTU in the unit's starting and changing modes. The GTU is started by an asynchronous motor-generator with a phased-wound rotor. This new design required a new approach to problems of protecting the unit from damage to equipment and to other kinds of safety problems. The safety features incorporated in the UKL-7 and AK-72 are described in detail. For the purpose of explosion proofing the area containing the plant, the natural gas collector was extended along the outside wall of the engine room and warning devices were installed to warn of a dangerous concentration of combustible matter in the air. When the concentration reaches about 20 percent of the minimum explosion hazard limit, emergency ventilation is turned on and the GTU is stopped automatically. This has not been necessary in 10 years of operation. The natural gas is branched off from the common collector by a system of three valves, one of which is connected to the atmosphere via a blow-off pipe and is located between a prestop and stop valve. When the stop and prestop valves are closed the blow-off pipe valve is open, connecting the pipeline between the stop and prestop valves with the atmosphere; interlocking protection is thereby provided. This prevents the penetration

of natural gas from the collector into the equipment when the plant or GTU are turned off. The gas turbine unit of the 7.3 atm plant consists of a compressor group, a starting combustion changer, a gas turbine, a reducer, a motor-generator and an isolated system for controlling them and is technologically independent of the production of nitric acid. The AK-72 with a capacity of 1150 tons/day employs a similar principle. The gas turbine unit is started and stopped independently of the state of chemical production process parameters. The GTU can operate with damage to or during the inspection of equipment of the conversion and absorption sections. This speeds up the inspection of equipment in start-up and adjusting operations or when inspecting the condition of chemical process equipment. With an emergency in the chemical processing sections the interlocking safety system shuts off the supply of ammonia to the mixer, of water for irrigating the absorption column and of natural gas in the catalytic cleaning unit, and switches the gas turbine unit's operation to the power mode. The equipment of the conversion, absorption and catalytic cleaning sections then not only remains under operating pressure, but is ventilated by a steady stream of air passing through it. The safety of equipment and the GTU's machinery must be ensured when the plant changes over from the operating to the power mode. Also discussed are problems overcome in ensuring safety features for the nitrous oxide compressor and in automatically monitoring the flame jet. The conditions are listed under which interlocking devices are actuated in the GTU, and in which the motor-generator is shut off in the 7.3 atm unit in an emergency. For the purpose of improving the plant's operating safety, all the key operations for controlling the plant have been automated. The ratio of ammonia to air in front of the mixer and the ratio of fuel to air prior to the combustion chamber are automatically regulated in the 7.3 atm unit. References 22: 22 Russian.

[39]

CSO: 1841

LARGE PLANTS OF THE CHEMICAL INDUSTRY

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 315-319

UPADYSHEV, K. L., Chief Technologist, GIAP [State Scientific Research and Design Institute of the Nitrogen Industry and Products of Organic Synthesis]

[Abstract] With the increase in capacity of chemical plant units there has been an increase both in savings and in the requirements for the reliability and safety of units. There are now plant units which have the capacity to produce as many as 1500 tons/day of ammonia, 1200 of ammonium nitrate, 900 of nitric acid, 1700 of carbamide, 1800 of methanol and 245 of caprolactam. Various aspects of the design of modern chemical plant units are discussed, with emphasis on the reasons for and prevention of large-scale accidents and pollution of the environment. The high reliability and safety of these units are especially necessary inasmuch as they are not provided with backup systems for the key equipment, resulting in prolonged shutdowns for repairs. Examples are given of design defects which have resulted in equipment lost time and blunders adversely affecting safety and reliability. In the selection of raw material and finished products, all the characteristics of the impurities present and their role in the technological process are not always studied. The failure to take chlorine into account in raw hydrocarbons has resulted in corrosion of the reactor tubes of a steam reforming furnace and other equipment and in the contamination of certain catalysts and the final product. Air contaminated with chlorine has been used as raw material for the production of ammonia. New designs of equipment are being incorporated in large plant units for the purpose of both making the equipment safer and of making it small enough for transportation by rail. New equipment designs should provide even distribution of flow, intensive heat and mass transfer, low hydraulic resistance, the absence of "dead" spots in which substances can accumulate which are dangerously explosive or have a tendency toward spontaneous combustion, good seals for the purpose of preventing the undesirable mixing of agents, durability of construction materials, and repairability. In the selection of materials for equipment, special attention must be paid to the possibility of corrosion cracking of steel types in such media as ammonia. Further study is necessary in this area. Presently 0.2 percent by weight of water is added as an inhibitor. Specifications for automatic controls and interlocking devices are discussed. These include independent but parallel-operation control and safety interlock systems, the provision of redundant sensing elements for the purpose of eliminating unnecessary shutdowns of equipment in the case of a malfunction in the safety controls, and the

successive tripping of safety interlocking devices for stopping hazardous production processes in multistage processes. Measures for ensuring the proper operation of automatic control and monitoring systems are discussed. In the oil refining industry pipelines are heated by using current-conducting bands of glass cloth containing a wire. This method might be used for electrical lines. Accidents have occurred because of the failure to provide independent electric power for serving different stages of a single complex process. The need for standby power sources based on generators driven by internal combustion engines or steam turbines, or employing storage batteries, is stressed. Gas exhausts must be analyzed thoroughly for pollutants, both from the standpoint of environmental protection and contamination of chemical processes. The quality of water used must also be monitored carefully. A careful study must be made of the possibility of and conditions for the appearance of biochemical reactions in mixing equipment; the products of these reactions can be hazardous for subsequent stages of the technological process, e.g., oxides of nitrogen for low-temperature separation of gases. For the purpose of reducing the danger of explosion, all equipment except that which must be placed inside should be installed in open areas. A list is given of reasons for accidents in equipment for unforeseen reasons, in spite of the fact that it was installed outside. The major cause was failure of bearings, packing glands, and gaskets (30.2 percent). The majority of accidents (about 75 percent) evolved over a period of time sufficient for the prevention of explosion. The majority of explosions could be prevented with the existence of automatic signaling devices for dangerously explosive gases in the air. The dimensions of areas designated as having a high explosion risk must be refined to take into account the range of the spread of the exhaust gas or steam. The need for automatic warning systems is stressed. References 8: 6 Russian, 2 Western.

[39]

CSO: 1841

SOCIALISTIC COMPETITION AT ENTERPRISES AND ORGANIZATIONS OF THE CHEMICAL INDUSTRY IN LIGHT OF PROBLEMS OF THE CURRENT FIVE-YEAR PLAN

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 9, 1979 signed to press 11 Sep 79 pp 515-521

CHEREDNICHENKO, K. K.

[Abstract] The state of affairs in the chemical industry was examined and the role of socialistic competition in fulfillment of the tasks set before the sector were described. Examples of formalism in organization of competition were discussed with conclusions about further use of forms and methods of competition to present this. Successes of some enterprises where competition actively serves fulfillment of tasks were presented. It was noted that well organized competition facilitates fulfillment of both technical-economic indicators and social problems, the solution of which helps to increase worker productivity.

[27-2791]

PRACTICE AND PROBLEMS IN ORGANIZATION OF SOCIALIST COMPETITION IN THE 10TH FIVE-YEAR PLAN

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 9, 1979 pp 521-536 signed to press 11 Sep 79

GOL'DIN, L. I., DRACHEV, B. V. and CHEREDNIK, A. G.

[Abstract] Speeches presented by participants in the competition in the city of Kazan, convening in July 1979, were reviewed. These addresses considered the present state of organizational work in the area of development of socialist competition in the chemical industry, analyzed existing shortcomings and presented recommendations of the conference for the removal of these deficiencies and for the elimination of formalism in the organization of competition. Lengthy excerpts from some speeches were presented.

[27-2791]

WARMING UP REACTORS OF SYNTHESIS OF ORGANOCHLOROSILANES IN A FLUIDIZED BED

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 9, 1979 pp 563-564
signed to press 11 Sep 79

KUZ'MIN, N. G., BOGATYREV, V. N. and STOGAR, V. A.

[Abstract] Different methods of warming up reactors of synthesis of organosilanes in a fluidized bed of silico-copper melt by use as a heat carrier of hot nitrogen and water vapor were examined. An equation for calculation of the time of warm-up with consideration of the mass of silicon copper melt, the mass of the reactor itself and the heat loss in the environment was presented for each method of warm-up. The recommended method of warm-up permits reduction of its time and improves the work conditions in the operation. Figure 1.

[27-2791]

USSR

UDC 621.352.6

ELECTROCHEMICAL PROCESSES IN CELLS CONTAINING THIN MONOPOLAR ELECTRODES

Moscow ELECTROKHIMIYA in Russian No 9, Sep 79 pp 1324-1328 manuscript received 20 Oct 78

KOSHEL', N. D., Dnepropetrovskiy Chemical-Technological Institute imeni F. E. Dzerzhinskogo

[Abstract] The distribution of processes for the title electrodes was considered when the electrodes were immersed in an electrolyte containing both reactive compounds and the gaseous reaction products. Equations were developed for three cases: 1, the leads were connected to one side of the electrode; 2, double-sided leads were used; 3, leads were connected to the opposite side of the electrodes. Configurations 1 and 2 result in individual cells; only 3 results in a multi-element cell. The analytical solutions to the current flow equations indicated that reactions were localized in the areas of the leads. For electrodes having an infinite width, the sum current I for the first two cases approached a constant value: $I_{\max}^{II} = 2I_{\max}^I$. For case 3, the maximum current I occurred for an average width of about 1.5 and then decreased asymptotically for further increases in the width. The maximum current was not obtained due to the lack of proper alignment of the leads. Aligned leads are unsuitable for multielement cells. References 6: 5 Russian, 1 Western

[03]

USSR

UDC 631.81

EFFECT OF LONGTIME APPLICATION OF MINERAL AND ORGANIC FERTILIZERS ON THE ORGANIC MATTER OF THE SOIL

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 8, 1979 pp 27-30

KHLYSTOVSKIY, A. D., VEKHOV, P. A. and the late BOGDANOV, N. M., Scientific Research Institute of Fertilizers and Insectofungicides imeni Professor Ya. V. Samoylov

[Abstract] The effect of the longtime application of mineral fertilizers and manure on the organic matter in dern-podzolic soil was investigated in the course of five multi-annual (1932-1977, 1938-1977, and other) experiments with various crop rotation systems (CRS) at the Dolgoprudnaya Agrochemical Experimental Station of the Samoylov Institute of Fertilizers and Insectofungicides. The topsoil (0-20 cm) samples collected were tested for content of carbon, nitrogen, and humus, compared with their original levels. It is concluded that moderate doses of mineral fertilizers in CRS without grasses or with annual grasses do not substantially affect the organic matter content of dern-podzolic soil. High fertilizer doses cause the topsoil to have a higher carbon and nitrogen content compared with nonfertilized control topsoil. But even extremely high doses of fertilizers cannot prevent the original carbon and nitrogen content of the topsoil from diminishing. Manure applied in the dose of 9 tons per hectare in CRS based on clean fallows does not assure a stable level of organic matter in the soil, but in the CRS including annual grasses it does assure such a level. An increase in the organic matter of the soil was observed only upon longtime annual application of 6-9 tons of manure per hectare in CRS employing two-year grasses and against a background of liming.

[49-1386]

TECHNOLOGICAL DEVELOPMENTS IN THE PROCESSING OF KARATAU PHOSPHORITES

Tashkent UZBEKSKIY KHIMICHESKIY ZHURNAL in Russian No 4, 1979 pp 53-56

YUNOSOV, D. Kh., TADZHIYEV, T. Kh., GORBENKO, A. N., ARIFDZHANOV, S. Z., and SAIPOV, A. E., Institute of Chemistry, Academy of Sciences Uzbek SSR

[Abstract] A brief review is presented of current trends and advancements in the technology of Karatau phosphorite processing. Of current interest are an effective and economical method of electrosublimation, 2.5-3 fold facilitation of nitric acid mediated decomposition by ultrasound cavitation, and treatment of ordinary and double superphosphate with gaseous ammonia or ammonia compounds. Tables 1.

[57-12172]

SINGLE STAGE NEUTRALIZATION AND DRYING OF ACID DOUBLE SUPERPHOSPHATE IN A FLUIDIZED BED SYSTEM

Tashkent UZBEKSKIY KHIMICHESKIY ZHURNAL in Russian No 4, 1979 pp 44-48

ADYLOVA, M. R., USMANOV, I. I., and PAVLOVA, A. I., Institute of Chemistry, Academy of Sciences Uzbek SSR

[Abstract] Experimental conditions are described for the neutralization and drying of acid double superphosphate obtained from Karatau phosphorites by means of a KS apparatus using an ammonia-air mixture at 120-140°C to create a 100-110°C fluidized bed. Increasing the ammonia supply above stoichiometric levels leads to a marked decrease in water-soluble forms of phosphorus, while assimilable forms of phosphorus remain in the 95-98% range. The hygroscopic properties of ammoniated double superphosphates depend on granular size and duration of neutralization and drying. Tables 3; References: 2 Russian.

[57-12172]

SAFETY OF LARGE PLANTS FOR THE PRODUCTION OF AMMONIA

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 353-359

KHARLAMOV, V. V., Candidate in Technical Sciences and Chief Engineer of GIAP [State Scientific Research and Design Institute of the Nitrogen Industry and Products of Organic Syntheses], SEMENOV, V. P., Candidate in Technical Sciences and Director of the GIAP Scientific Research Division of Production of Process Gases, and KISELEV, G. F., Candidate in Technical Sciences and GIAP Chief Mechanical Engineer and Chief of the Scientific Research Division

[Abstract] Modern plants for the production of ammonia carry out many interrelated processes, including the mechanical and catalytic cleaning of gas and fluid flows, the compression of gases and fluids, heat and mass exchange under conditions of high temperature and pressure, various catalytic decomposition and synthesis reactions, and the burning of gaseous, liquid and solid fuel. A system this complex can operate efficiently only automatically with the total or partial control of a computer. Operating personnel have to work with toxic combustible and dangerously explosive substances under a pressure of as much as 320 atm over a wide temperature range from -70 to $+1400^{\circ}\text{C}$. The key reasons for many accidents are violations of production process discipline, insufficiently high reliability in the operation of machinery and equipment, as well as in the operation of monitoring and automatic devices, the unsatisfactory organization of maintenance work and the use of faulty equipment, and poor knowledge regarding ways of ensuring safety. In the production of ammonia there is the steady exhausting of smoke gases after the process in the tubular furnace, and these contain in slight quantities the toxic products CO , SO_2 and NO_x , as well as CO_2 in large amounts. All gases released in the startup period or in violations of the production procedure are burnt off. The radius of the health safety zone around an ammonia production plant is 1000 m. A table is given of the maximum permissible concentrations of harmful substances in the ground layer of air, for nitrous oxide, ammonia, carbon monoxide and sulfur dioxide, for population centers and in the working area of industrial enterprises. The height of stacks for exhausting smoke gases varies from 40 to 100 m. There is no contaminated water in the normal operation of a plant. Water discharges occurring in an emergency when equipment is washed is collected in a special tank from which it is sent out for the recovery of waste materials or it is processed by the plant's purification system. With regard to the fire protection of chemical reactors, special attention must be paid to the possibility of reducing the rate of chemical reactions either by cooling, stopping the flow or even by emergency evacuation. Equipment and pipelines must be protected against heat, cold, humidity, vibration,

corrosion, erosion and the appearance of leaks and overflows. For the purpose of conserving fresh water, in large plants for the production of ammonia air is widely used for cooling process flows and condensing water vapor. This measure has made it possible to reduce the consumption of cooling water from 25,000 to 3000 m³/h, has improved the reliability of equipment and at the same time has improved safe operating conditions. In addition, the corrosion of cooling equipment has been reduced and the possibility of unwanted gas and water mixtures has been eliminated. All technological equipment is placed in open areas; only compressors are located in buildings. The training of operators in key production sections begins at the majority of enterprises 16 months before the startup of a plant. An operator must be trained as a general technologist with a clear understanding of all processes taking place at all production stages. Existing local automatic safety systems do not satisfy the requirements for the safe and accident-free operation of large plants for the production of ammonia. Their major disadvantage is the fact that they evaluate a pre-accident and accident situation only in terms of individual parameters, but they are not able to prevent the development of accident situations originating because individual elements of automatic equipment go out of order. Computers are used at some plants to predict and prevent accidents, e.g., the M-6000 system at the Nevinnomyssk "Azot" [Nitrogen] Production Association. This system takes into account malfunctions of individual elements of automatic equipment. Data are given on reasons for unscheduled shutdowns of large ammonia production plants in the first three years of operation, on the length of lost time for these plants, on the reasons for and the length of this lost time for the periods of 1963-1969, 1963-1971 and 1969-1976, on the lost time of an ammonia plant in terms of its individual equipment, on the reliability of imported turbocompressors, on an annual analysis of shutdowns of imported compressors, on an analysis of the operation of oil pumps in an ammonia plant, and on the capacity for work of individual compressor components. Much of these data are collected from foreign sources. These data are discussed in terms of measures which can be taken for the purpose of improving the indicators reflected. Figures 2; references 26: 6 Russian, 20 Western.

[39]

MASTERY AND SAFE MAINTENANCE OF THE MULTITON PRODUCTION OF NITROPHOSPHATE FERTILIZERS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 360-363

LUBIS, B. A., Chief Engineer, Ionava Nitrogen Fertilizer Plant imeni the 25th CPSU Congress

[Abstract] A summary is given of problems overcome and of safety measures introduced in the mastery of the production of various kinds of nitrophosphate fertilizers at the Ionava Nitrogen Fertilizer Plant imeni the 25th CPSU Congress in the Lithuanian SSR. The production of nitrophosphate fertilizers at this plant is based on the decomposition of an apatite concentrate with nitric acid and binding the excess calcium with sulfuric acid into a sulfate. Phase one of the process was introduced in 1975 and phase two in 1977. A chief problem, not entirely overcome, has been the precise dispensing of initial components. Dispensers of free-flowing materials have worked satisfactorily, but dispensers of acids and gaseous ammonia are still causing a lot of trouble. The lack of automatic commercial pH meters has made it difficult to maintain the required pH. One stage in the production of a nitrophosphate fertilizer is granulation and drying of the pulp, which is carried out in combination dryer-granulator-classifiers. A great amount of work is being done to provide safe conditions for the operation of this equipment in order to prevent the thermal decomposition of the nitrophosphate fertilizer and the consequent release of a great amount of contaminants--oxides of nitrogen, chlorine and fluorine, etc.--in production areas. Experiments have demonstrated that the self-decomposition occurs from overheating of the fertilizer and that the temperature of thermal decomposition depends on the duration of the heating. It has been determined that for the purpose of avoiding the self-decomposition of a nitrophosphate fertilizer during the drying period the composition of the pulp should equal: $N_{amm} \approx 6.4$ percent, $N_{nitr} \leq 5.15$ percent, $SO_4^{2-} \geq 18.5$ percent and $Cl \leq 18.9$ percent, with a pH of 4.9 to 5.1 (excluding moisture). Having a great influence on self-decomposition are conditions of the granulation process, such as temperature conditions, the composition of the entering pulp and its pulverization, and adhesion to the walls and blades of granulators. Analyses were made of exhaust gases from the granulator at different periods after a cleaning. The liberation of gases increases with an increase in the amount of nitrophosphate fertilizer adhering to the blades and walls of the combination unit. This is conducive to the start of thermal decomposition. The combination unit proved to be unsatisfactory and had to be reconstructed; the stages in this reconstruction are detailed. When cleaning the combination unit,

adhesion is prevented by employing anti-adhesion materials which maintain the temperature to a maximum of 320°C and have sufficient mechanical strength. These coatings are applied to the inside surface of the unit. Measures taken to improve sanitary conditions at work places and to reduce effluents include the use of dust-trapping vacuum pumps. Cyclone dust separators are employed. The discharge of dust with exhaust gases has been reduced. Cyclone dust separators now trap 93.9 percent of the dust. In the production process the reactors release gases containing volatile components, i.e., oxides of nitrogen, vapors of acid, gaseous compounds of fluorine, and ammonia. Absorption is performed at 65 to 80°C and 100 to 400 mm Hg. Various methods which have been used to absorb these volatile components are discussed. The catalytic, adsorption and absorption methods of cleaning off oxides of nitrogen are discussed. The only suitable method for cleaning the gas from the production of a nitrophosphate fertilizer is absorption with alkaline solutions. A diagram is given of the absorption method now used. The new method of cleaning exhaust gas from the production of a nitrophosphate fertilizer has made it possible to increase the degree to which NO_x and fluoride compounds are trapped to 30 to 40 percent. A changeover has been made from soda cleaning of the exhaust gas to carbamide-carbamate cleaning; this new method has made it possible to control the process conveniently, to reduce the corrosion of equipment considerably and to almost eliminate the clogging of equipment. Measures taken to simplify the production process and improve the reliability of equipment have resulted in the elimination from the process equipment of 76 different units. This has resulted in facilitating the work of operating personnel and in ensuring the stability of the equipment's operation at maximum loads. Figures 1; references 10: 6 Russian, 4 Western.

[39]

CSO: 1841

EXPERIMENTAL WORK WITH FERTILIZERS IN THE SYSTEM OF THE STATE AGROCHEMICAL SERVICE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 7 1979 pp 4-6

CLISHKO, A. A., Candidate of Agricultural Sciences [CAS], TKACHENKO, D. F., CAS and VASILENKO, M. G., CAS, Kiev Branch of the TsINA0

[Abstract] Zonal (oblast) agrochemical laboratories of the Ukr SSR carry on, every year, thousands of tests on farms serviced by them to get insight into effectiveness and ratios of mineral fertilizer doses used on the republic's farms. Guidance for their recommendations on doses is thus achieved. Field trial results are processed by computers. Organization of this work at the Volynskiy, Dnepropetrovskiy, Zaporozhskiy, Crimean (which has a staff of 22 people) and L'vovskiy agrochemical laboratories is praised. These laboratories have groups of 3 assigned to field trials. Students who assist apparently earn study credits. Shortcomings are noted: lack of scientific personnel, shortage of equipment, too much area for too few people to cover. Methods must be developed, specifics of areas tested must be learned, financial support must be provided. Plans for improving agricultural yields will be accomplished by well-run field and production experiments.

[30-8586]

USSR

FRONT RANK PEOPLE IN THE AGROCHEMICAL SERVICE IN VORONEZH OBLAST

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 7 1979

KIPROCHENKO, V. V., Head of the Voronezh Oblast Agrochemical Laboratory

[Abstract] Tribute is paid to those who have contributed to yield increases in the Oblast, e.g., at the "Novousmanskii", "Krylovskiy", and Lenin sovkhoses and the Path of Lenin kolkhoz. These people include N. S. Averkin, a senior agrochemist (for fertilizer use) and N. S. Aksenov, senior agrochemist at the "Path to Communism" kolkhoz, for use of fertilizer and for organization. His kolkhoz has been a steady model and achiever over the years, with his help.

[30-8586]

THERMAL DECOMPOSITION OF NITROAMMOFOSKA AND NITROFOSKA

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 5 1979 pp 50-52

MOSHKOVICH, F. B., Candidate of Chemical Sciences, PODSHIVALOVA, G. N., RUCHKINA, M. I. and STRIZHEVSKIY, I. I., Candidate of Chemical Sciences, State Scientific Research Institute of the Nitrogen Industry and Products of Organic Synthesis

[Abstract] Note is taken of the potential breakdown of complex fertilizers by heat, especially the title decomposition. This report evaluates the dangers of spontaneous decomposition on heating of the nitro fertilizers. The heat source was an incandescent lamp as a common initiator of thermal decomposition; the lamp capacity was 40 and 100 watts, corresponding to 450 and 1120 cal/min. No self-propelled spread of decomposition around a source of heat, with nitroammofoska, occurred. Temperature at the start of decomposition of the nitroammofoska was 217-220°C, approximately 20°C above that for nitrofoska; the former thus presents less potential danger than the latter. Tests to determine whether additives of trace elements influenced the temperature for start of thermal decomposition showed that the presence of trace elements had no such effect. Graphs display thermograms of decomposition of nitroammofoska and nitrofoska. Figures 4; references 5: 2 Russian, 3 Western.

[29-8586]

STANDARDS FOR SOWING WINTER WHEAT AND THE ECONOMIC EFFECTIVENESS OF MINERAL FERTILIZERS UNDER THE CONDITIONS OF THE UKRAINIAN SSR FOREST STEPPE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 5 1979 pp 47-50

SHEVCHENKO, An. I., Candidate of Agricultural Sciences, and SHEVCHENKO, Al. I., Mironovskiy Scientific Research Institute of Selection and Wheat Seed Culture

[Abstract] The present study was done in 1974 to 1977 in the central area of the right bank of the Ukrainian forest steppe--by the Mironovskiy Wheat Selection Center--under prevailing unstable moisture. The wheat (Mironovskaya 10 and Il'yichevka) was sowed after corn. Precipitation

varied from 404 to 650 mm per year on the average. Procedures of the All-Union Scientific Research Institute of Fertilizers and Soil Science were used to evaluate economic effectiveness of the mineral fertilizers. Effectiveness, in terms of rubles, is tabulated exhaustively against standard sowings of seeds, i.e., 3,4,5 and 6 ml seeds per hectare, and against fertilizer variants, e.g., none, P50K60, N60P60K60, the latter + N30 in the spring, or spring and fall, N90P90K90 and N120P60K60. Data suggest that Il'yichevka gives better yields than Mironovka 10 over the specific selected conditions of sowing, fertilizer and soil conditions. References 8 (Russian).

[29-8586]

USSR

UDC 632.95.024

TOXICITY OF PESTICIDES FOR THE IMAGO OF ENCARSIA FORMOSA

Moscow KIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 5 1979 pp 36-38

LEBEDEV, V. V. and PETRUSHOV, A. Z., Candidates of Biological Sciences

[Abstract] *Encarsia formosa* has been used to combat the greenhouse whitefly. Conflicting reports on its susceptibility to pesticides exist and this work has examined various pesticides to find which would not affect the *encarsia* imago. Substances studied include aktellik, akreks, benlate, karatan, carbofos, kelton, orten, pirimor, tedion and rogor. Toxicities of the pesticides are graphed and tabulated. It is concluded that when *encarsia* is used to biologically control the whitefly over a covered ground, minimal use is to be made of chemical agents, especially organophosphorus pesticides. Figures 2; references 8 (Western).

[29-8586]

MOSCOW OBLAST PRODUCTION-SCIENTIFIC AGROCHEMICAL ASSOCIATION: TASKS AND ACHIEVEMENTS

MOSCOW KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 5 1979 pp 6-9

MUKHIN, N. S., Chief [of the Association]

[Abstract] The title association was organized in 1974 to achieve more effective utilization of mineral and organic fertilizers, chemical materials for plant protection and to improve agrochemical servicing of sovkhozes, kolkhozes and other agricultural enterprises in the Moscow Oblast. Included in the association were the Moscow Oblast Planning-Research Station of Chemization of Agriculture and the Autotransport Enterprise, "Transsel'khoztekhnika". It has 33 agrochemical centers which service 400 farms (including 253 sovkhozes and 63 kolkhozes), involving 1.7 mil hectares of agricultural land of which 1.2 mil is plowed. Its tasks include direction of the agrochemical centers, the Oblast Station and the Transport enterprise, agrochemical servicing, preparation of guides for chemicalization, supply, storage of fertilizers, exploitation in practise of scientific achievements.

[29-8586]

STATUS AND PERSPECTIVES OF CHEMICALIZATION OF AGRICULTURE IN THE AMUR RIVER REGION

MOSCOW KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 5 1979 pp 3-5

MAVRIN, I. F., Second secretary of the Amur Oblast Committee of the CPSU

[Abstract] The Amur Oblast is known as the granary of the Far East. It has 2.5 million hectares of agricultural land, 1.8 million of which are plowed. It yields considerable soy, meat, milk and potatoes. Available electric power has doubled in the last ten years. Tractors are available; more than half of the Baykal Amur railway is on its territory; the Zeiskiy and Bureyskiy hydroelectric power stations are being completed; population is growing; animal husbandry is rising in volume. Plans to increase production are in being and agricultural activities are to be increased, including reclamation, which involves among other things overcoming acid soils. Chemicalization is a basic factor. A Biogeochemical

Laboratory (headed by V. V. Kovalskiy) was set up, in 1972, at the Amur Oblast Planning-Research Station for Chemization of Agriculture; it is guided by the Institute of Geochemistry and Analytical Chemistry imeni Vernadskiy, USSR Academy of Sciences. The laboratory is intensely examining the soil for its composition and shortcomings so as to recommend chemical treatment for its improvement (e.g., correcting low trace element and iodine content). Chemicalization has increased the agriculture yields of the Oblast and is expected to continue to do so.

[29-8586]

CSO: 1841

USSR

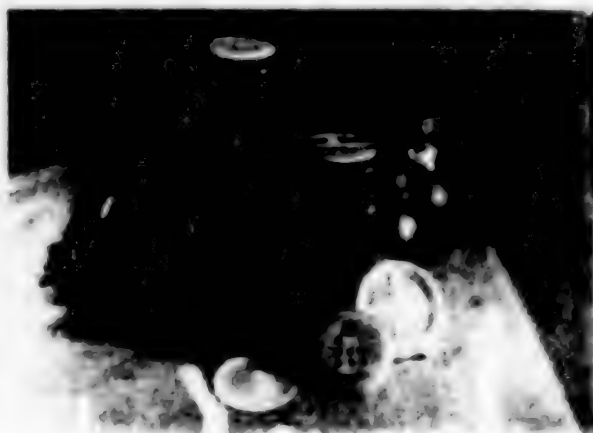
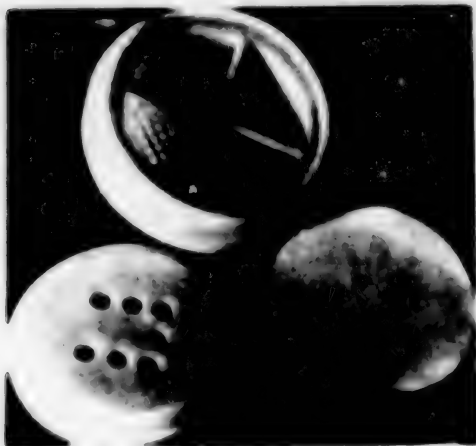
A LID WITH A MEMBRANE

Moscow KHMITYA I ZHIZN' in Russian No 8, 1979 p 52

IONCHENKOVA, I. V.

[Abstract] A novel lid is described for jars used in preserving fruits and vegetables which permits storage in the fresh state for up to two months in the refrigerator. The lid is constructed of polyethylene with high molecular weight organosilicon components and consists of three sections: a frame, a grid, and a semipermeable membrane. Apparently the semipermeable membrane assures sufficiently higher concentrations of carbon dioxide and depressed oxygen concentrations to favor prolonged storage in the fresh state at +1 to +5°C. Figures 2.

[61-12172]



CSO: 1841

PRODUCTION OF PROTEIN FODDER YEASTS FROM PRELIMINARY HYDROLYZATE AT THE BAYKAL PAPER AND PULP PLANT

MOSCOW GIDROLIZNAYA I LESOKHIMICHESKAYA PROMYSHLENNOST' in Russian No 6, 1979 signed to press 22 Aug 79 pp 8-10

ORLOV, V. I., Candidate in Technical Sciences, D'YAKONOV, L. A. and VORSIN, V. V., Baykal Paper and Pulp Combine

[Abstract] The production of protein fodder yeasts from preliminary hydrolyzate of conifer wood (pine and larch) is described and a block diagram of the procedure is presented. A method for preventing "Caramelization" of the preliminary hydrolyzate by means of peptization of soluble lignin by a sulfite-yeast concentrate is described. This method greatly reduces the formation of "caramel" on equipment of the Baykal Paper and Pulp Combine. Physico-chemical indicators of preliminary hydrolyzates produced during production of cord cellulose from pine and larch are presented.

[23-2791]

UDC 577.15.156.1.644.3.38

PLASTEINS. PREPARATION, PROPERTIES AND USE IN NUTRITION

MOSCOW USPEKHI KHIMII in Russian Vol 48 No 9 Sep 79 pp 1684-1710

BELIKOV, V. M. and GOLOLOBOV, M. Yu., Institute of Hetero-organic Compounds, USSR Academy of Sciences, Moscow

[Abstracts] This is an extensive review of the title subject. Interest in the plastein reaction--the re-formation of protein, by an enzyme, e.g., pepsin in an enzymatic hydrolysate of any protein--has enkindled with the growing need in the world for edible proteins. The reaction has potential for synthesis of high-quality proteins with desirable essential aminoacid content. Areas covered in the monograph are 1) conditions and reagents essential for the reaction; 2) physical properties and structure of plasteins (character as proteins; molecular weights, aminoacid composition, rheological properties); 3) factors affecting plastein reaction (protein source, structure of substrate, substrate concentration, enzyme used, pH of medium, temperature ionic strength of

medium); 4) incorporation of aminoacids in plasteins; 5) use of plasteins in nutrition (purification of proteins and use of proteins containing essential aminoacids, preparation of nutritive protein pastes and gels which are high-quality food or which improve foods as additives, attention to desirable organoleptic qualities). References 143: 19 Russian, 124 Western.

[25-8586]

CSO: 1841

USSR

UDC 543.24:543.80

QUANTITATIVE ASSAY OF HYDRAZIDES ON DIARYLPHOSPHINIC ACIDS BY POTENTIOMETRIC TITRATION WITH SODIUM NITRITE

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 34 No 9 Sep 79
pp 1853-1855

YANCHUK, N. I., Ternopol State Pedagogic Institute

[Abstract] Phosphorus acid hydrazides and their derivatives find use as physiologically-active agents, polymers and agricultural chemicals. This article reports an effort for quantitative analysis of such hydrazides; analysis of such compounds has apparently been hitherto unavailable. This is the first report of use of NaNO_2 titration of phosphorus-containing hydrazides. Hydrazides of diarylphosphinic acids readily react with nitrous acid in an HCl medium to form the corresponding azidese. Acidity of the medium depends essentially on the course of the reaction. A procedure is described for quantitative potentiometric titration by NaNO_2 in 0.01-0.02 M HCl solution. Concentration of hydrazine in a test sample (P, %) is calculated by the formula

$$P = \frac{EMkV}{m} \cdot 100$$

where E is the hydrazide equivalent (numerically equal to its molecular mass), M is the molarity of the NaNO_2 solution, k is the correction coefficient for molarity of the NaNO_2 solution, V is the volume of NaNO_2 solution expended in the titration and m is the weight in mg of the hydrazide sample. References 8: 5 Russian, 2 Czech, 1 Rumanian

[55-8586]

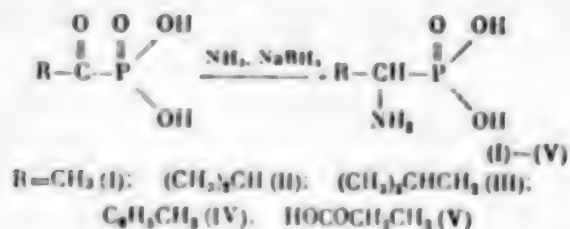
CSO: 1841

ORGANOPHOSPHORUS ANALOGS OF BIOLOGICALLY-ACTIVE SUBSTANCES. REPORT 5:
SYNTHESIS OF α -AMINOPHOSPHONOUS ACIDS AND SEVERAL DERIVATIVES OF
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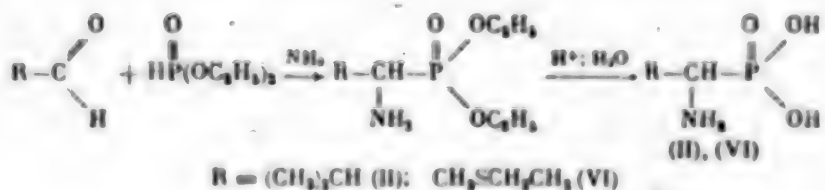
Moscow IZVESTIYA AKADEMII NAUK SSSR Seriya Khimicheskaya No 9 Sep 79
pp 2118-2122 manuscript received 5 May 78

KHOMUTOV, R. M., OSIPOVA, T. I., ZHUKOV, Yu. N. and GANDURINA, I. A.,
Institute of Molecular Biology, USSR Academy of Sciences, Moscow

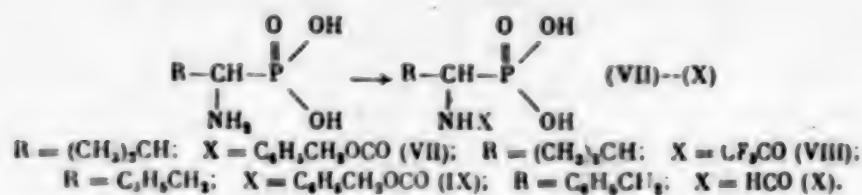
[Abstract] Aminophosphonous acids (APA) have found application in enzyme research, hence synthesis of new derivatives of these compounds was felt to be of practical importance. Production of APA is analogous to the synthesis of aminoacids. Khomutov, et al., synthesized APA by a one-step procedure described earlier (1978) by them:



Another procedure for APA syntheses is the aminophosphonylation of aldehydes:



Using conditions analogous to those for aminoacids, the authors also produced N-formyl, N-trifluoroacetyl, N-carbobenzoxy derivatives of APA:



Chemical properties of the APA analogs are discussed. Detailed procedures are described for the syntheses. References 10: 3 Russian, 7 Western.

[50-8586]

USSR

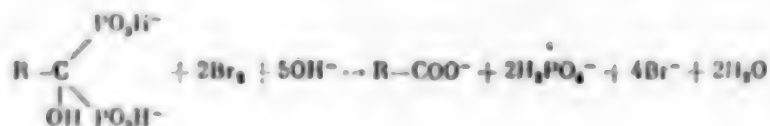
UDC 542.943:547.1'118

OXIDATION OF 1-AMINOALKYLIDENE-1, 1-DIPHOSPHONOUS ACIDS BY BROMINE IN A BICARBONATE SOLUTION

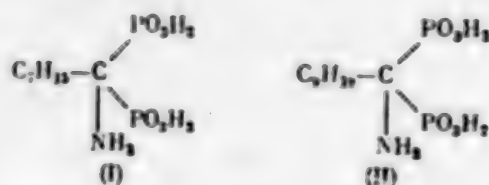
Moscow IZVESTIYA AKADEMII NAUK SSSR Seriya Khimicheskaya No 9 Sep 79
pp 2115-2117 manuscript received 15 Jun 78

ALFER'YEV, I. S., Kotlyarevskiy, I. L. and MIKHAILIN, N. V., Institute of Chemical Kinetics and Combustion, Siberian Department, USSR Academy of Sciences, Novosibirsk

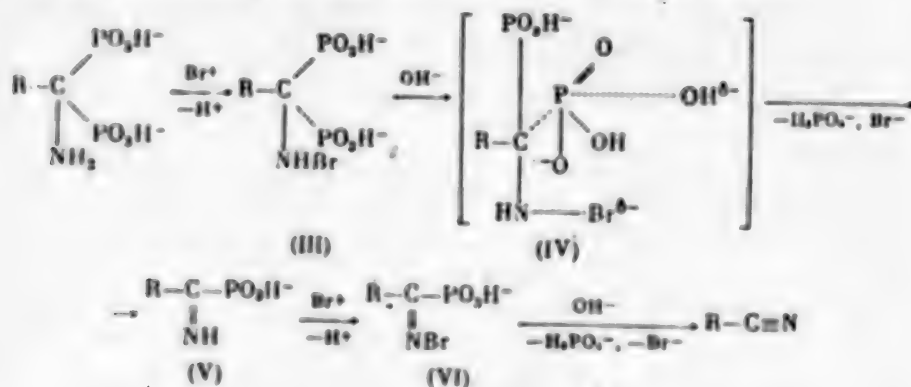
[Abstract] The oxidation of 1-hydroxyalkylidene-1, 1-diphosphonous acids with bromine in bicarbonate solutions to the carboxylic acids and phosphate has been shown (Blaser, et al., 1971) to proceed as follows:



Here the OH, which occupies an alpha position, is known to facilitate the oxidation. The present article examines the role of substances which contain an amino group in the alpha position:



Under reaction conditions, the bromine oxidation was found to lead to formation of nitrites, in the following suggested manner:



Reaction conditions, and spectrum identification of products are detailed. References 7: 1 Russian, 6 Western.

[50-8586]

CSO: 1841

INFLUENCE OF SOLVENT ON REACTIONS OF ALKENES WITH PHOSPHORUS PENTACHLORIDE

Moscow IZVESTIYA AKADEMII NAUK SSSR, Seriya Khimicheskaya No 9 Sep 79
pp 2108-2114 manuscript received 14 Jun 78

KULOMIYETS, A. F., FOKIN, A. V., KROLEVETS, A. A., PETROVSKIY, P. V.
and VERENIKIN, O. V.

[Abstract] It was found that reaction of PCl_5 with alkenes is substantially simplified under conditions which promote dissociation of the PCl_5 into a PCl_4^+ cation or the $\text{PCl}_4^+ \cdot \text{PCl}_6^-$ ionic pair, which confirms the ionic mechanism of the reactions. Various solvents for the reaction were tried: Me_2SiCl_2 , CH_2Cl_2 , aromatic hydrocarbons (benzene or toluene), AcCl and MeCN . A series of eight alkenes (tabulated) were reacted with the PCl_5 . Data on polarity of the medium and in the donor properties of the solvent decrease the temperature for initiation of a reaction. The course of the reaction with PCl_5 is found to be a function of the structure of the alkene, the temperature for accomplishing the condensation and breakdown of adducts, alkanes, phosphorylated alkenes or 2-chloroalkanes. Extensive IR, PMR and NMR spectral data, and mass-spectra of the synthesized products are presented. References 11: 3 Russian, 8 Western.

[50-8586]

UDC 66.048.5:661.7:547.261.118.31

PURIFICATION OF DIMETHYL PHOSPHATE BY VACUUM DISTILLATION IN A FILM ROTARY EVAPORATOR

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 9, 1979 signed to press 11 Sep 79 pp 545-546

DEGTYAREV, V. V., KUKUSHKIN, V. V., VINNIKOV, Ye. A., KHILYNOV, V. V.
and LOSKUTOV, L. G.

[Abstract] The possibility of use of a thin film evaporator for purification of dimethyl phosphate showed the dependence of the composition of the distillate and the productivity of the evaporator on the residual pressure, loading and temperature of the heat carrier. Schematic diagrams of the experimental apparatus and the film evaporator were presented. A mathematical model of the process which may provide the basis for control of the technological regime of distillation in the process was presented. References: 8.

[27-2791]

USSR

2,4-D AMINE SALT, 40% WATER-SOLUBLE CONCENTRATE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 8, 1979 pp 57-59

PARSHUTIN, S. M., All-Union Scientific Research Institute of Chemical Crop Protectants

[Abstract] 2,4-D amine salt, 40% water-soluble concentrate, is a selective systemic-action herbicide used to destroy annual dicotyledon weeds in the plantings of grain and certain other crops. Basic information on this herbicide is now provided. Treatment with this herbicide is not effective at an air temperature of 18-20°C and in the absence of rain for at least the first 5 hours afterward. 2,4-D is effective against fat hen (*Chenopodium album*), charlock, field pennycress, amaranth, sunflower windfall, cornflowers, shepherd purse, field forget-me-nots, quickweed, poppy, plantain, buttercups, certain species of bistort and dock, and also shoots of nettle and sowthistle. It is effective against persistent weeds when used in a combination with certain other herbicides. The applicable dosage of 2,4-D amine salt is 1.5-2.5 kg per hectare during the tillering stage, applied by spraying. This dosage can be lower or higher for specified types of weeds and crops. While 2,4-D is a relatively nontoxic herbicide, protective clothing is recommended for the spraying personnel. The herbicide is flammable and hence fire safety measures should be observed in its handling. Smoking is absolutely forbidden. 2,4-D should be stored in sealed containers. Its shelf life is two years.

[49-1386]

USSR

UDC 632.95.02

RESISTANCE OF INSECTS TO DICHLORVOS AND CHLOROPHOS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 8, 1979 pp 59-61

The late POPOV, P. V., the late SHAPOVALOVA, G. K. and GALITSINA, V. V., VNIKHSE

[Abstract] The formation of insect populations resistant to dichlorvos vapors and cross-resistant to other insecticides was investigated for the housefly. The attendant selection process resulted in flies in whom resistance to dichlorvos vapors increased slowly and even after selection

in the 72nd generation was no higher than 10x. The flies undergoing this selection process were found to have acquired relatively low cross-resistance (2-27x) to 15 other insecticides, except as regards chlorophos (70-230x). Thus the selection resulted in flies with low resistance to dichlorvos but extremely high cross-resistance to chlorophos. Resistance and cross-resistance stabilized beginning approximately with F₁₅-F₂₀. Given the resulting extremely high resistance to chlorophos, its practical application is contraindicated. The positive qualities of dichlorvos include its toxicity toward flies which have, owing to selection, become extremely resistant to other insecticides. The findings warrant the assumption that the mechanism of resistance (biochemical detoxication) is the same in dichlorvos and in chlorophos. The established difference in intensity of resistance to dichlorvos compared with chlorophos is attributable to the more rapid rate of chemical detoxication of chlorophos compared with that of dichlorvos. Figures 3; references 3; all Western.

[49-1386]

USSR

UDC 531.82:632.954

JOINT APPLICATION OF HERBICIDES AND FERTILIZERS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 8, 1979 pp 30-36

The late BOGDANOV, N. M. and ZALENYUK, T. A., Scientific Research Institute of Fertilizers and Insectofungicides imeni Professor Ya. V. Samoylov

[Abstract] Herbicides and mineral fertilizers are fairly often applied jointly, but little is known about their effect in such cases on weeds as well as on crop yields. This question can be elucidated only with the aid of a longtime experiment. Such an experiment has been under way since 1969 at the Dolgoprudnaya Agrochemical Experimental Station, with three crop-rotation systems, each based on three different crops. The results are now evaluated with respect to the first CRS cycle (1969-1974). The herbicides applied were pyramine, eptam, banvel-D, and 2,4-D. It was established that crop rotation (sugar beets, barley, oats, potatoes, vetch, winter wheat, grasses, flax) and the use of farming machinery destroyed fat hen (*Chenopodium album*) in the agrophytocenosis. However, the weed infestation of the sowings increased by a factor of 1.4-1.7 times as an aftereffect of the application of fertilizers. On the fertilized fields, matricary, hemp nettle, fumitory, and certain other weeds proliferated to a greater extent than on the unfertilized fields and thus began to predominate in the phytocenosis. It is concluded that

the level of weed infestation of sowings increases in direct proportion to the fertilizer dose owing to the increase in both the number and quantity of weeds. Some weeds (fat hen) then get completely eradicated while others, more resistant, begin to proliferate. Thus the attendant short-term application of herbicides does not reduce the overall level of weed infestation, since their toxic effect is offset by the positive effect of fertilizers on weed growth. Effective weed control can be achieved only by tailoring specific herbicide systems to every particular crop rotation system, and this still requires further research.

[49-1386]

USSR

UDC 632.954

FENAZON (60% WETTING POWDER)

Moscow KHIMIYA V SEL'SKOM KHOZHAYSTVE in Russian Vol 17 No 7 1979 pp 47-78

PARSHUTIN, S. M., Candidate in Agricultural Sciences, in consultation with the All Union Scientific Research Institute of Chemicals Used for Plant Protection

[Abstract] The title herbicide, used to control weeds, has a systemic action, penetrating plants through the roots and leaves; it is sprayed on the soil before appearance of weeds which are very sensitive to it in the seed stage. A list of the rather large number of weeds sensitive to fenazon is presented, as well as those weeds more resistant to it. In this article, which is in the nature of an instruction brochure, precautions, times for application, doses and methods of application--for various climates--are presented. Safety measures are cited, although the herbicide is only slightly toxic for animals--e.g., use of gloves, respirators, eye protectants. It should be stored in a dry state.

[30-8586]

CSO: 1841

USE OF TKHAN-87 AND SEMERON ON PLANTINGS OF WHITEHEAD CABBAGE UNDER IRRIGATION

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 7 1979 pp 44-47

KARASTYLEV, N. P., "Krasnopartizanskiy" Sovkhoz of Kustanayskaya Oblast

[Abstract] Cabbage growing in Kazakhstan urgently requires weed control. In the Kustanay Oblast, the plantings are made on the Tobol River flood plains which are weed-infested. TKHAN-87 [sodium trichloroacetate] has been successfully used for weed control and the present work describes its application in combination with semeron. Tests were done on the author's sovkhoz in 1974-1974--the TKHAN-87 was applied two weeks before planting and semeron twelve days after planting. Effectiveness of the program is tabulated. The combined use does lower weed contamination and, also, the amount of manual labor expended.

[30-8586]

USE OF HERBICIDES AGAINST OFFSHOOT WEEDS IN CROP ROTATION

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 7 1979 pp 39-41

IVANTSOV, N. K., Candidate of Agricultural Sciences, Velikie Luki Agricultural Institute

[Abstract] The weeds examined in this work were thistles, viz., the creeping thistle [*Cirsium arvense*] and the sow-thistle [*Sonchus arvensis*]. Studies were made in 1974 to 1978 on the "Ugrayskoye" teaching farm of the author's institute; crops in rotation were barley, lupine for silage and barley and clover. Herbicides tested were diamet-D, linuron + treflan, dicotex, tropotox and cis-67MEB (a mixture of 2M-4X and 2M-4XM). Weed contamination of the farm plots was very high and typical of the problem for the soil-and-climate zone. Success in control of the weeds could be achieved by combination of the herbicides with appropriate agrotechnical handling of the soil to provide destruction of the root system. References 3 (Russian).

[30-8586]

USSR

PETROCHEMICAL PROCESS INSTITUTE SOLVES PROBLEMS

Leningrad LENINGRADSKAYA PRAVDA in Russian 4 Oct 79 p 1

[Article by Zh. Manilova: "The Birth of a Giant"]

[Text] The collective of the All-Union Scientific Research Institute of Petrochemical Processes, founded at the very beginning of the First Five-Year Plan, has already been working for 50 years on designing new industrial processes for an important sector of the national economy--petrochemistry. The weight of its contribution lies particularly in the development of petrochemistry at Kirishi. The significance of the problems which the institute's specialists are now working on solving may be judged, for example, from one of the items of the socialist obligations taken on by the collective in the fourth year of the five-year plan:

"In order to accelerate the introduction of the institute's developments, to give scientific-technical assistance to the Permmefteorgsintez Production Association in launching the industrial complex for the production of diethylhexanol and butyl alcohols in accordance with a new method. Compared with the existing production facilities, this complex should ensure a reduction in the expenditure indicators for raw material and energy by at least 20 percent. The anticipated economic saving from one unit is 3 million rubles a year."

We will begin with the fact that the specialists of the oxosynthesis laboratory who are responsible for the fulfillment of this project, are at the final, and therefore a very crucial stage of work, of the laborious work of many years that is now being completed by introducing its results into industrial production. It is a question, as we can see from the socialist obligations, of a new, highly efficient industrial process for obtaining butyl alcohols and diethylhexanol--the most important initial products for the production of various plastics, insulating materials and leather substitutes. The scientists have been faced with this problem for a long time. It has become very critical, because the industrial process adopted for the petrochemical enterprises could not ensure obtaining the necessary amount of these petrochemical products nor, even more important, their high quality. The industrial flaws then made themselves felt in all the subsequent links of the complex production chain. As a result--the quality of the paint and varnish materials and plastic, leather substitutes and insulation materials in the cable industry is sometimes not high enough.

Maksim Petrovich Vysotskiy, head of the oxosynthesis laboratory and candidate of technical sciences, says that the difficulty of designing a new method was also complicated by the need to develop an industrial process for high-tonnage production of these products. In other words, he states, the entire undertaking would be only of a partial nature, and could scarcely affect the sector's progress. It was necessary to establish large-scale production, or rather--a complex of production facilities--on the basis of a highly efficient continuous production process, using the newest equipment and means of automation.

From the very beginning, therefore, the collective of Leningrad scientists could see the solution to this important national economic task.

By now the collective has had solid experience in working out industrial processes for high-tonnage production. This was the service of the founder of the laboratory Professor D. M. Rudkovskiy, and this was a serious situation, in other words, perhaps, the problem would prove to be beyond its powers. There is a second factor. It was just at that time that the institute set up close creative relations with the scientists of the national enterprise of the Walter Ulbricht Leyn-Werke in the GDR. Just as the Leningrad specialists, the German chemists worked hard and in earnest on oxosynthesis processes, that is, the process of forming complex products containing oxygen. In addition, they had a semi-industrial unit to finish up the work on the new production processes.

In a word, the preliminary meetings and discussions with our German comrades were completed to mutual satisfaction by an intergovernmental agreement between the USSR and the GDR. The work began.

The head of the laboratory and director of the topic, K. A. Alekseyeva, candidate of chemical sciences, as well as communist N. I. Yefimova, senior engineer, and all the others both veterans and quite young--participants in this major work are rather hesitant to speak today of the difficulties that they have, of course, encountered. They remember rather, how the entire collective of the laboratory rejoiced when they were able to surmount these difficulties and complete a certain specific stage of research. Then they speak with great respect of the German colleagues and of the close creative friendship that was born and strengthened in the combined work.

It must be said that from the very beginning, a council of specialists was set up to direct the work group and coordinate the research. The USSR group was headed by M. V. Zinin, deputy chief of the Soyuznefteorgsintez Production Association, and the GDR group--by Doctor Hans Baltz, chief of the scientific research division of the Leyn-Werke national enterprise. The work group itself consisted of very experienced specialists.

M. P. Vysotskiy says that he could name many highly qualified laboratory associates, but then adds that he considers the work of each participant in the research useful and necessary. On the other hand, when speaking of the work, he repeatedly mentions the names of German colleagues--Doctor Sigfried Poredda and Doctor Rudolph Shmuk. Maksim Petrovich spoke of them as high-class specialists. Collaboration with them, he added, afforded the entire laboratory collective true creative satisfaction.

The design of the new industrial process was concluded when at Perm, at the Permetfteorgsintez Association, the construction of a large-scale industrial complex was begun. It should become a pioneer in the sector with respect to high-tonnage production of scarce monomers in accordance with the new method.

A tense moment arrived: the construction of the complex limited the periods for working out the industrial process and rushed the designers and manufacturers of the equipment. They worked at full strength, under tension that they had not felt for a long time. They kept their word: The Leningrad workers issued all the necessary documentation by the deadline and the German machine builders supplied the necessary equipment to Perm'. Finally, the day arrived when, in the words of Viktor Stepanovich Fedorov, minister of the Petroleum Refining and Petrochemical Industry, a true petrochemical giant was put into operation. This was this summer, on 19 June--a day that Leningrad scientists consider to be for themselves both a holiday and a test at the same time. The unit, operating according to the new industrial process at that time yielded the first tons of products, needed by many sectors of the country's national economy. Of course, the unit's output at the planned capacity still needs time and the indispensable help of the Leningrad specialists. Tens of thousands of tons of critically scarce monomers a year--that is the capacity of just a single unit, and there will be two of them at the Perm' plant.

New worries have come up for the laboratory's associates. They are beginning the design of other advanced oxosynthesis processes, and at some of them the production will be able to be taken on after several years, and at others--in the more distant future. The status, however, of the head institute in the sector obliges the entire collective of the All-Union Scientific Research Institute of Petrochemistry to work today for the future. The Leningrad scientists see in this a pledge of progress in domestic petrochemistry.

[32-12151]

CSO: 1841

USSR

GAS REFINERY PROGRESS REPORTED FROM TASHKENT

Tashkent PRAVDA VOSTOKA in Russian 29 Sep 79 p 1

[Article by V. Shumaylov: "Mubarek Gas and Sulfur"]

[Text] Yesterday the second section of the Mubarek Gas Refinery yielded its output. With the planned capacity reached, the new units will make it possible for the enterprise to double its output. The country's main gas pipelines will begin to receive over 10 billion cubic meters of refined fuel per year, and the chemical plants--hundreds of thousands of tons of sulfur, which will make it possible to obtain millions of tons of mineral fertilizers in addition.

The Mubarek Plant is now one of the largest-scale enterprises of this sector in the country. Its expansion was undertaken in the 10th Five-Year Plan in connection with the opening up of new underground stores of natural gas with a high sulfur content in the south of Uzbekistan. For example, fuel from the Zevarda deposit was received for refining for the first time. In the near future, one more industrial line will begin operation--it will take gas from the deposit from Dengizkul' to Khauzak that is distinguished by an increased hydrogen sulfide and carbon dioxide content.

The second section of the plant was constructed within the period specified by the schedule, despite the delays that occurred at the start of the work. The collectives of construction and installation workers worked at shockwork rates, installing new domestic equipment manufactured in Moscow, in the Ukraine, in Belorussia and Estonia and in other regions of the country. The brigade of Aleksandr Kalinin, holder of the orders of the Medal of Honor and Labor Renown class III, gave an example of selfless work, technical creativity and great skill. The installation workers were twice awarded the title of "Best Brigade of the USSR Ministry of the Gas Industry." Members of this collective Valeriy Sabirov, Nikolay Dakombayev and Grigoriy Molanch developed a mastery of three jobs each, which helped them to overfulfill the plan regularly. At the beginning of the year Kalinin's brigade installed, in a matter of hours, the 240-ton absorber equipment without using hoisting cranes, with only small-scale mechanization devices. This made it possible to save thousands of rubles and to gain a great deal of time.

Highly efficient equipment has now gone into operation in the steppes near Mubarek that makes it possible to achieve a considerable increase in labor productivity. Due to putting equipment with a high unit capacity into operation, the second section was made 5 million rubles less expensive than the first, and occupies 4-fold less space. The automated control systems helped to reduce the number of personnel.

The operations workers took on the socialist obligation: to start up all the plant equipment for the planned operations ahead of schedule. In order to keep its word, the collective formed comprehensive brigades working at an increased rate--they are to put in effect the estimated productivity of the equipment. At the same time, the plant's workers decided to manage without calling in new workers and engineers: the Shchekinskiy method was adopted. The workers who resolved to master additional occupations are raising their level of knowledge through special courses.

[32-12151]

CSO: 1841

SYNTHESIS AND INVESTIGATION OF BROMINE DERIVATIVES OF BETA-ARYLHYDROXYETHYL NAPHTHENATES

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSSR, SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 5 1979 pp 67-71 manuscript received 13 Mar 79

NIYAZOV, A. N., ORAZDURDYYYEVA, G., BEREZHNOY, V. G. and MOLLAKOV, B. M., Institute of Chemistry, Turkmen Academy of Sciences

[Abstract] Bromine derivatives were synthesized through interaction of esters and bromine in carbon tetrachloride. Bromination of beta-arylhydroxyethyl esters of cyclohexane-carboxylic and native naphthenic acids yielded ethyl dibromines ["dibromine-substituted ethers"] and m-cresoxy-ethyl ether of cyclohexane-carbonic acid formed ethyl tribromine [tribromine-substituted ether], with only the benzene ring subject to bromination, and intact naphthene constituent. 2 figures; 5 Russian references.

[56-10,657]

COMPOSITION AND CHEMISTRY OF RESINOUS ASPHALTENE SUBSTANCES IN PETROLEUM FROM WEST TURKMENISTAN SITES

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSSR, SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 5 1979 pp 63-66 manuscript received 2 Mar 79

CHELPAKOVA, M. P., AYDOGDYYEV, A., and SERGIYENKO, S. R., Institute of Chemistry, Turkmen Academy of Sciences

[Abstract] This is a continuation of studies of petroleum from Kotur-Tepe, Ovol-Toval and Burun sites. Separation and examination of petroleum residue recovered at temperatures above 500° from petroleum from the above sites revealed 27-29% tarry asphaltene substances in relation to crude oil. The resinous substances consist of undivided resins, resins soluble in phenol, insoluble in phenol and those eluted in carbon tetrachloride, benzene and alcohol with benzene. The residues of oil from these 3 sites are similar in resinous-asphaltene substance and sulfur content. There is a correlation between carbohydrates contained in the oil, composition and properties of the resinous asphaltene constituent. 1 figure, 2 tables; 7 Russian references.

[56-10,657]

REFINEMENT OF CLASSIFICATION OF PETROLEUM AND GAS RESOURCES

Ashkhabad IZVETSIYA AKADEMII NAUK TURKMENSKOY SSSR, SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 5 1979 pp 86-91 manuscript received 23 Mar 79

TACHMURADOV, B. M., Turkmenburgaz

[Abstract] The proposed refinement of classification of various categories of resources, based on exploration and estimation of contents of deposits and layers differing in structure would provide greater reliability of resources reported to the USSR State Commission on Mineral Resources and have a beneficial effect on immediate and long-term planning of gas recovery from specific petroleum and gas-bearing regions. 3 figures; 3 Russian references.

[56-10,657]

A MODEL FOR OPTIMIZING THE PRODUCTION PROGRAM OF PETROCHEMICAL ENTERPRISES IN THE PRESENCE OF VARIABLE COEFFICIENTS OF OUTPUT AND EXPENDITURES

Baku AZERBAIDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4, 1979 pp 22-27

RZAYEV, T. G., Scientific Research and Project Design Institute of Overall Automation of Petroleum and Chemical Industry

[Abstract] A simple yet universal procedure for constructing a linear model for the optimal planning of operations of petrochemical enterprises with allowance for variability of coefficients of output and expenditures is presented. All input and output factors (consumption of raw and other materials and power, output of main products and byproducts) of each type of production are assumed to be independent variables. The model represents a linear programming analogue of a previously developed non-linear model. A formula for evaluating the dimensionality of the model is derived. The proposed procedure is applied to calculations of the production program of an enterprise refining petroleum and making chemical products. The introduction of the model at a number of enterprises has demonstrated its expediency and practicality. Figure 1; references 6; all Russian.

[43-1386]

INVESTIGATION OF THE SYNTHESIS OF N-SUBSTITUTED CARBOXYLIC ACID AMIDES ON THE BASIS OF LIQUID PRODUCTS OF PYROLYSIS

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4 1979 pp 64-66

SHIKHALIZADE, P. D., MEKHTIYEV, S. I., GAYBOVA, E. M. and TABIYEV, R. B., VNIIOLEFIN [All-Union Scientific Research Institute of Olefins]; Azerbaydzhani Institute of Petroleum and Chemistry imeni M. A. Azizbekov

[Abstract] The possibility of synthesizing N-(phenylethyl)-acetamide by reacting styrene with acetonitrile and sulfuric acid was investigated. The optimal acetonitrile:styrene:sulfuric acid:water ratio was found to be equimolar. The maximum yield of N-(phenylethyl)-acetamide, 90.9%, was observed at a reaction temperature of 60°C and a reaction time of 1 hr. The chemistry of the course of the reaction was analogous to that of the synthesis of N-(phenylethyl)-amide of metacrylic acid by reacting metacrylonitrile with styrene. The polymerizability of the unsaturated nitrile used in the reaction apparently is not a major factor in the synthesis of N-(phenylethyl)-amides--it is rather the reactivity of the nitrile group itself that is the principal factor here, while the structure of the radical bound to it does not directly affect the synthesis reaction. Figures 2; references 3: 2 Russian, 1 Western.

[43-1386]

INVESTIGATION OF THE EFFECT OF GAMMA RADIATION ON THE HIGH-PARAFFIN CRUDE FRACTION BOILING AT 60-150°C

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4 1979 pp 61-63

MELIKZADE, M. M., SUBKHANVERDIKHANOV, A. E., DADASHEVA, E. K. and MAMEDOVA, B. A., Azerbaydzhani Civil Engineering Institute

[Abstract] The UV irradiation of hydrocarbons and fuels is known to result in the formation of a considerable quantity of peroxides. In this connection in view of the growing possibility of developing new technological processes based on utilizing the energy of radioactive radiation, the effect of various types of irradiation on hydrocarbons and petroleum products should be researched. Accordingly, the effect of

gamma irradiation on the 60-150°C fraction isolated from high-paraffin crude was investigated. Irradiation in doses of $0.3 \cdot 6 \cdot 10^6$ rad was found to affect insignificantly the physico-chemical properties of that fraction. Similarly, chromatographic analysis revealed that, in the presence of the above doses, the hydrocarbon composition of the fraction in question underwent only insignificant chemical changes. I. e., gamma irradiation caused some increase in the amount of unsaturated hydrocarbons and the alkenes and naphthenes underwent some intramolecular realignment, but on the whole the changes in the 60-150°C fraction following its gamma irradiation were not substantial owing to the presence of a considerable proportion of aromatic hydrocarbons which produced a stabilizing effect on the irradiated system. Figures 3: all Russian.

[43-1386]

USSR

UDC 547.5.514

FREE-RADICAL ADDITION OF CYCLANONES TO UNSATURATED HYDROCARBONS

Baku AZERBAJDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4 1979 pp 42-46

SULEYMANOVA, E. T., MEKHTIYEV, S. D., ALIMARDANOV, Kh. M., BABA-ZADE, S. S., KASUMOV, L. I. and MIRGASANOVA, M. I., Institute of Petrochemical Processes imeni Yu. G. Mamedaliyev

[Abstract] The effect of the structure of cyclanones and unsaturated aliphatic- and alicyclic-series hydrocarbons on the yield and composition of their free-radical-initiated addition in the presence of tert-butyl peroxide was investigated. The experiments were conducted in a metal vial under reactant vapor pressure in the presence of a ketone-olefin-peroxide molar ratio of 4:1:0.15 at 160°C for 4 hr. The reaction products were subjected to chromatographic analysis. It is established that, in terms of reactivity to free-radical-initiated addition to unsaturated hydrocarbons, the investigated alicyclic ketones can be aligned in the following diminishing series: cyclopentanone > 3-methylcyclopentanone > cyclohexanone, 4-methylcyclohexanone > 2-methylcyclopentanone > 2-ethylcyclopentanone. The introduction of the alkyl substituent into the alkylated ketone molecule increases the yield of reaction products--alkylcyclanones. In terms of reactivity at initiated addition to cyclanones the investigated unsaturated hydrocarbons may be aligned in the following diminishing series: n-alkenes-1 > isoalkenes-1 > cycloalkenes > alkylcycloalkenes. References 10: 7 Russian, 3 Western.

[43-1386]

SYNTHESIS OF N-OCTYLETHYLAMINE BY REDUCING N-OCTYLACETAMIDE WITH LITHIUM ALUMINOHYDRIDE

Baku AZERBAIDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4, 1979 pp 28-32

ISMAYLOV, F. K., ALIYEVA, S. A., AVANESOVA, S. S., GADZHIYEVA, Kh. M. and SHAKHTAKHTINSKIY, T. N., Institute of Problems of the Theory of Chemical Technology

[Abstract] In view of the rising demand for alkylamines the possibility of utilizing N-substituted amides for amine synthesis is being explored. Such amides, however, are relatively unreactive compounds and their reduction is a complicated process. In this connection, experimental findings on the synthesis of N-octylethylamine from N-octylacetamide obtained by condensing acetonitrile with diisobutylene in the presence of acid catalysts are presented. The reduction was accomplished directly by adding droplets of ester solution of the amide to a suspension of lithium aluminohydride. It is shown that the optimal reaction temperature is the boiling point of the solvent used--35°C for diethyl ester, and 65°C for tetrahydrofuran. The maximum yield of the amine (mol.% 71.44) under these conditions was achieved in the presence of a molar ratio of 1.25:1 between lithium aluminohydride and amide, on using diethyl ester as the solvent. Increasing the reaction time from 2 to 12 hr resulted in increasing the yield of N-octylethylamine from 71.44 to 79.60 mol.%. Figures 2; references 4: 2 Russian, 2 Western.

[43-1386]

INVESTIGATION OF THE CATALYTIC PROPERTIES OF URANIUM-ANTIMONY CATALYSTS OF THE OXIDATIVE DEHYDROGENATION OF ISOAMYLENES

Baku AZERBAIDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4 1979 pp 6-12

NAGIYEV, T. M. and ZUL'FUGAROVA, S. Z., Institute of Basic Research Into Chemical Technology

[Abstract] The activity of uranium-antimony catalysts was investigated as a function of their ingredients and phase composition. 3 different catalyst specimens were investigated: one without a carrier (I) and two

(II and III) with a carrier $X = Al_2O_3$, but differing in their content of active ingredient--6.6 and 14 wt.%, respectively, for II and III. Physicochemical (derivatographic, x-ray structural, and IR-spectroscopic) analyses established the presence of the phase $USbO_5$ in specimen I, representing a mixture of the oxides of uranium and antimony, following calcining at $800^\circ C$. The carrier-based specimens II and III reveal the presence of the phase USb_3O_{10} following calcining at $800^\circ C$, along with reflection lines characteristic of the higher oxides of uranium and antimony. The optimal catalyst was found to be the one containing the larger amount of the active phase USb_3O_{10} , that is, specimen II: its activity with respect to the yield of isoprene was 1.34 times as high, and its selectivity, 1.02 times as high, compared with the indicators for specimen III. Thus, physicochemical and catalytic analyses demonstrate that the optimal composition of the Al_2O_3 -based uranium-antimony catalyst is the one containing 6-8% of the active ingredient. Figures 3; references 8: 5 Russian, 3 Western.

[43-1386]

USSR

UDC 541.1283

INVESTIGATION OF DYSPROSIUM OXIDE AS A PROMOTER OF THE ACTIVITY OF ALUMINUM-CHROMIUM CATALYST IN THE n-BUTANE DEHYDROGENATION REACTION

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 3 1979 pp 3-5

ZUL'FUGAROV, Z. G., EFENDIYEV, A. G., ALIYEVA, D. A. and MAMEDANDZE, N. Yu.,
Institute of Inorganic and Physical Chemistry

[Abstract] The effect of dysprosium oxide as a promoter of the activity and stability of the aluminum-chrome catalyst in the dehydrogenation of n-butane into butylenes was investigated. The factors considered were the temperature of the process and the amount of the promoter Dy_2O_3 in the composition of aluminum-chrome catalysts containing different quantities of Cr_2O_3 (6.0, 12%) in relation to the activity and stability of the catalysts. It was found that Dy_2O_3 is a satisfactory promoter when used for this purpose, particularly in the catalyst containing 12% Cr_2O_3 . The optimal amount of Dy_2O_3 to be added is 1.0% of the amount of the active component (Cr_2O_3). Then the activity and stability of the Dy_2O_3 -containing catalyst are 1.5-2.2 times higher than those of the catalyst K-5. The promoter principally interacts with the active component-- Cr_2O_3 --of the catalyst, and this results in stabilizing the catalyst's activity in the presence of high-temperature steam. References 9: all Russian.

[43-1386]

USSR

UDC 542.61.3/5:665.41

EXTRACTIIONAL PURIFICATION OF SOLID PARAFFINS WITH DIMETHYLFORMAMIDE

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 6-8

TARASOV, D. K., PEREVERZEV, A. N., and FADEYEV, V. S.

[Abstract] Gas chromatography, UV and IR spectroscopy were employed in analyses of solid paraffins before and after extractiional purification with dimethylformamide (DMF). Studies conducted with brands T and E₄ paraffins showed that extraction with DMP improves the quality of the paraffins in terms of color, oil content, and stability as a result of elimination of low melting point paraffins, as well as of aromatic and oxygen-containing compounds. The latter products may be utilized in coking. Tables 2; Figures 3; References: 2 Russian.

[56-12172]

USSR

UDC 665.637.733:537.212

DEPARAFFINIZATION OF RESIDUAL CRUDE IN A HETEROGENOUS ELECTRIC FIELD

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 3-6

KAZAKOVA, L. P., GUNDYREV, A. A., ABASZADE, M. N., and SIDOROVA, N. V., MINCH and GP [expansions unknown] imeni I. M. Gubkin

[Abstract] Results are presented of the use of heterogenous electric fields in the deparaffinization of raffinate obtained from Siberian oil fields. Optimum results were obtained under the following conditions: solvent (Galosh benzine) to raffinate ratio 1:6 (mass), 60°C thermal treatment, 2-4°C/min rate of cooling to a working temperature of -25°C and 33.5 kV/cm electric field for 180 s. Tables 2; Figures 4; References 6: 2 Russian, 4 Western.

[58-12172]

CSO: 1841

USSR

UDC 542.973.8:621.928.028.4

GRANULAR FILTERS FOR PURIFICATION OF BEAD CATALYST REGENERATING GASES
AT CATALYTIC CRACKING PLANTS

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 16-17

SIDORENKO, N. A., BAGDASAROVA, V. A., and BASHKARDIN, V. Ya.

[Abstract] Evaluations were made of granular filters used in the purification of bead catalyst regenerating gases at experimental catalytic cracking plants. The results showed that continuous operation for 250 h under the conditions described eliminates about 96.4% of the dust from the gas when the filter is subjected to a gas load of $1080-1130 \text{ m}^3/(\text{m}^2 \cdot \text{h})$. Scale-up has been devised for the employment of this approach at the Novokuybyshevsk refinery. Figures 2; References: 1 Russian.

[58-12172]

USSR

UDC 543.87+65.521.3

TENDENCY OF JET FUELS TO FORM DEPOSITS ON HEATED SURFACES

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 17-20

SEREGIN, Ye. P., GORODETSKIY, V. G., COLENEV, N. P., and PROKUDIN, V. N.

[Abstract] Studies were conducted on the tendency of various aviation fuels to form deposits on heated surfaces which demonstrated that DTS-2 test equipment was best suited for such investigations. Data are presented for several fuels (T-1, TS-1, RT, and T-6) on the relationship between the degree of refining, thermostability, and the temperature at which deposits first occur. The temperature ranges at which deposits begin to appear are $85-100^\circ\text{C}$ for T-1 and TS-1, $135-180^\circ\text{C}$ for RT, and $180-190^\circ\text{C}$ for T-6. The techniques outlined here may be used for the design of appropriate aviation fuels to meet various requirements. Tables 2; Figures 1; References: 8 Russian.

[58-12172]

CSO: 1841

USSR

UDC 62-634.2:536.5:66.092.1

DETERMINATION OF THE DECOMPOSITION TEMPERATURES OF JET FUELS FROM THE
HARDNESS FACTOR

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 20-22

BUKHARKIN, A. K., and KOVALEV, G. I.

[Abstract] The influence of the hardness factor was evaluated on temperature decomposition of several aviation fuels in a system in which the duration of exposure to a given temperature was monitored within the range of the cracking zone. The results demonstrated that the hardness factor, $f = t \tau^{0.06}$ (where t is temperature in $^{\circ}\text{C}$ and τ = time), can be used in determining the starting temperature for decomposition. For fuels RT, TS-1, T-8B, and T-6 the hardness factor at which thermal decomposition commences is within the range of 635-655. Tables 3; Figures 1; References 4: 1 Western, 3 Russian.

[58-12172]

USSR

UDC 62-634.2.004.4

CHANGES IN THE PROPERTIES OF FUEL T-6 ON PROLONGED STORAGE

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 22-24

MELENT'YEVA, N. I., MALYSHEVA, I. V., KALITINA, N. N., and SAVIN, L. N.

[Abstract] Determinations were made of various properties of hydrated T-6 fuel stored for 2 years in surface metal tanks in the northern climatic zone under excess air-vapor pressure of 2 kPa. The results showed that under these conditions the quality of the fuel did not deteriorate. Tables 2; References: 7 Russian.

[58-12172]

CSO: 1841

USSR

UDC 621.892.09:546.212

EFFECT OF WATER ON THE PERFORMANCE OF MINERAL OILS WITH MINERAL ADDITIVES

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 24-27

KICHKIN, G. I., KLEYMENOVA, Z. A., and POSTNIKOVA, N. G.

[Abstract] Several samples of DS-11 oil with detergent additives and three commercial motor oils were tested for the extent to which water (1% in oil) washed out the additives. In terms of the ash content, approximately 2-40% of the ash content was lost. Water treatment also led to a decrease in alkalinity, but the latter was unrelated to the ash content. Barium additives were removed 1.5-2 times more efficiently than calcium additives; however, the detergent properties of the oils did not change significantly. Tables 4; References: 4 Russian.

[58-12172]

USSR

UDC 621.892.09:625.282.004.18

ECONOMIC USE OF MOTOR OIL IN DIESEL LOCOMOTIVES

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 27-30

ADAMENKO, S. P., and ZALENETSKAYA, I. S.

[Abstract] Various factors were analyzed on the consumption of motor oil by diesel locomotives which showed that, on the whole, in the case of majority of the diesel models oil consumption is too great according to current standards regulating oil changes. In general, cleanliness can be assured by more efficient operating conditions, improvements in the filtration system, and increasing the content of oil with an alkaline index of 9-11 mg KOH/g. Figures 3; References 4: 1 Western, 3 Russian.

[58-12172]

CSO: 1841

USSR

UDC 665.63:66.012.4.24

METHODS AND PRACTICE IN ESTIMATING PRODUCTIVITY OF REFINERIES

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 30-34

SHAPIRO, Ye. A.

[Abstract] A brief survey is presented of the methods employed in estimating the productive capacity of a refinery and of methods that may be implemented to insure a further increase in productivity. Emphasis is placed on the factors that enter into calculations of productive indicators and examples are provided of pertinent calculations. References: 2 Russian.

[58-12172]

USSR

UDC 543.544:543:80

CHARACTERISTICS OF THE GASOLINE FRACTION OBTAINED BY THERMODESTRUCTION OF BITUMINOUS OIL

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 35-37

KLEYEV, A. M., MARGULIS, B. Ya., MARTYNOV, A. A., and VIGDERGAUZ, M. S., IOFKH [expansion unknown] imeni A. Ye. Arbuzov

[Abstract] A chromatographic evaluation of the 35-95°C gasoline fraction obtained by thermal decomposition of bituminous oil was carried out. The initial analysis involving liquid chromatography in conjunction with fluorescent indicator spectra pointed to the presence of aromatic, olefinic, and paraffin fractions, which were subsequently analyzed by gas chromatography. The final results indicated that thermal destruction by means of a gas generator yields products similar to those obtained by oxidative cracking. Figures 4; References 11: 3 Western, 8 Russian.

[58-12172]

CSO: 1841

USSR

UDC 66.022.37:539.538

NOVEL ASH-FREE ANTIWEAR ADDITIVES TO LUBRICATING OILS

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 37-39

ROGACHEVSKAY, T. A., LASHCHI, V. L., VIPPER, A. B., MALYSHEVA, T. G.,
KAYDALA, Ye. V., and KLEYMENOVA, Z. A.

[Abstract] Several derivatives of triazine were investigated as ash-free additives to lubricating oils and shown to possess promising antiwear properties. Adsorptive properties of the triazine derivatives were dependent on their structure and composition. In terms of thermal stability the triazine derivatives were equivalent to the zinc dithiophosphate additives; several triazine compounds approached zinc dialkyldithiophosphate in antiwear properties. Tables 4; References: 3 Russian.

[58-12172]

USSR

UDC 66.077.7:620.193

EFFECTS OF MODIFIERS ON THE PROTECTIVE PROPERTIES OF THE AKOR-1 CORROSION INHIBITOR

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 8 1979 pp 40-41

KOPYLOV, L. I., SHEKHTER, Yu. N., GUREYEV, A. A., BOGDANOVA, T. I.,
and BAKALEYNIKOV, M. B.

[Abstract] Physicochemical and electrochemical tests were conducted to evaluate the effects of various additives on improving the anti-corrosive properties of the leading Soviet product AKOR-1. The final results showed that speed of action and protective properties were most improved by the addition of BK-6 alkylolamides, which made it almost comparable with calcium alkylbenzene sulfonate in terms of corrosion inhibition. Tables 1; Figures 1; References: 3 Russian.

[58-12172]

CSO: 1841

CRACKING IN THE IMMOBILE LAYER OF AN ALUMOPHENYLSILOXANE-MODIFIED CATALYST

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 53 No 9 Sep 79 pp 2300-2302
manuscript received 11 Dec 78

KOLESNIKOV, I. M. and BELOV, N. N., Moscow Institute of the Petroleum Engineering and Gas Industry imeni I. M. Gubkin

[Abstract] This is a description of experiments to extend the life of industrial aluminosilicate catalysts--which lose activity due to changes in porosity, structure of the polyhedrons and caking--by coating the surface of the catalysts with alumophenylsiloxanes. A kerosene-gas oil fraction of Malgobekskaya petroleum (chemical content and physical chemical properties of which are given in detail) was subjected to cracking using two forms of the catalyst, one a regenerated aluminosilicate catalyst, the other the catalyst modified with alumophenylsiloxane. The modifier was applied to the catalyst in acetone solution in quantities of 0.5, 1.0 and 2.0 mass %; the acetone was removed by vacuum and the modified catalyst was heated to 450°C for 2 hr in helium, followed by heating at 600° for 2 hr. Yield of coke after the cracking was determined by the ascarite method. Results of cracking are tabulated. Processing of results used equations of the kinetics involved; kinetic constants were calculated. The modified catalyst increased the yield of benzene by 1.5-4.0% with 0.5 mass % alumophenylsiloxane modification; with 1.0 mass %, it increased from 32.5 to 39.5%; with 2.0 mass % it increased by 9.5%. It is believed that the modifier adds a certain number of active centers onto the catalyst surface and might have potential for directed change in activity and selectivity of solid catalysts. Reference 1 (Russian--Kolesnikov, 1974).

[24-8586]

CSO: 1841

INVESTIGATION OF FRACTIONS OF SAMGORY CRUDE DESTINED FOR CATALYTIC REFORMING AND CRACKING

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian No 1 1979
pp 97-99 manuscript received 6 Apr 79

TOPURIDZE, O. F., KHITIRI, G. Sh. and MELIKADZE, L. D., Institute of Physical and Inorganic Chemistry, Georgian SSR Academy of Sciences

[Abstract] Considering that the gasoline fractions of Samgory crude display low octane numbers and a low susceptibility to tetraethyl lead, it was of interest to investigate their suitability for catalytic reforming with the object of converting them to high-octane fuel. To this end, the hydrocarbon composition of these fractions was investigated. In particular, the content of normal-structure in catalytically reformed methane hydrocarbons was determined by adsorption on molecular sieves. The adsorptional separation was conducted on synthetic zeolite Ca A in the vapor phase at 250°C. Desorption of n-paraffins was carried out at 350°C by means of steam. Every individual catalytically reformed fraction was separated into two fractions by passage through molecular sieves. The unadsorbed first fraction consisted of aromatic, naphthene, and methane hydrocarbons of ramified structure; the second, adsorbed fraction consisted of normal-structure methane hydrocarbons. The refractive indexes and aniline points were determined and tabulated. It was found that the content of normal-structure hydrocarbons in the catalytically reformed fractions was fairly high, 20-30%, and that their content of naphthene hydrocarbons also was 20-30%. Considering that the principal catalytic-reforming reactions are the dehydrogenation of naphthene hydrocarbons and the dehydrocyclization and isomerization of paraffin hydrocarbons of normal structure, it can be expected that these fractions can yield high-octane gasoline, especially since their low sulfur content precludes the need for desulfurization. Moreover, normal-structure paraffin hydrocarbons are currently becoming important as a processable raw material. All this can be accomplished on the basis of subjecting the 350-500°C fraction of Samgory crude to catalytic reforming.

[21-1386]

CSO: 1841

USSR

UDC 615.31:547.785.5

SYNTHESIS AND PHARMACOLOGICAL PROPERTIES OF CERTAIN DISUBSTITUTED
IMIDAZO[1,2-a]BENZIMIDAZOLES

Moscow KHMICO-FARMATSEVTICHESKIY ZHURNAL in Russian No 8 1979 pp 57-62
manuscript received 13 Dec 78

KOVALEV, G. V., ANISIMOVA, V. A., SIMONOV, A. M., GOFMAN, S. M., PETROV,
V. I., TYURENKOV, I. N. and FOMIN, Yu. K., Scientific Research Institute
of Physical and Organic Chemistry under Rostov University; Volgograd
Medical Institute

[Abstract] New derivatives of 9-diethylaminoethylimidazo-[1,2-a]benzimidazole which in position 2 have such radicals as n-bromophenyl, α -naphthyl, tert-butyl, and n-methoxyphenyl, were synthesized with the object of developing more effective hypotensive drugs. It was found that the hypotensive effect and its duration are enhanced when the diethylaminoethyl radical is introduced into position 9 in these derivatives and when such radicals as α -naphthyl, phenyl, and tert-butyl are introduced into position 2. Some of the resulting derivatives produced a greater hypotensive effect than the conventional hypotensive preparation RU-13 (dihydrochloride of 9-diethylaminoethyl-2-phenylimidazo[1,2-a]benzimidazole) and were only one-third to one-fourth as toxic, while in others the hypotensive effect combined with sedative and antipyretic properties.
References 8: all Russian.

[48-1386]

CSO: 1841

9-OXO-6,7,8,9-TETRAHYDROPYRIMIDO(4,5-b)(1,4)BENZTHIAZINES AND THEIR
ANTIFOLIC, CYTOTOXIC, AND CYTOSTATIC ACTIVITY

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 8, 1979 pp 51-57
manuscript received 30 Jan 79

NEMERYUK, M. P., MUSHNIKOVA, O. L., PYKHOVA, M. V., KEMEROV, A. F.,
RYABOKON', N. A., YERSHOVA, Yu. A., SOKOLOVA, A. S., CHERNOV, V. A.
and SAFONOVA, T. S., All-Union Scientific Research Chemico-Pharmaceutical
Institute imeni S. Ordzhonikidze

[Abstract] By reacting 5-amino-6-mercaptopyrimidines with 2-bromodimedone
and 2-bromodihydroresorcinol the authors synthesized 9-oxo-6,7,8,9-tetra-
hydropyrimido(5,5-b)(1,4)benzthiazines. Certain chemical properties
of these compounds are investigated. Most of these newly synthesized
benzthiazines produce an inhibiting effect on dihydrofolatereductase.
They also produce a cytostatic and cytotoxic effect, and certain deri-
vatives of this series of compounds display an in vivo antitumoral
activity, as revealed in experiments on rats, without, however, being
superior in that respect to the previously investigated 6-oxopyrimido
(4,5-b)(1,4)-thiazines. References: 3 Russian, 2 Western.

[48-1386]

SYNTHESIS AND PHARMACOLOGICAL INVESTIGATION OF CONDENSED HETEROCYCLIC
COMPOUNDS OF QUINUCLIDINE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 8, 1979 pp 45-51
manuscript received 16 Jan 79

BONDARENKO, V. A., KOMAROVA, N. A., ANDREYEVA, N. I., FILIPENKO, T. Ya.,
TURCHIN, K. F., MIKHLINA, Ye. Ye., MASHKOVSKIY, M. D., SHEYNKER, Yu. N.
and YAKHONTOV, L. N., Moscow, All-Union Scientific Research Chemico-
Pharmaceutical Institute imeni S. Ordzhonikidze

[Abstract] By reacting o-phenylenediamine and its C-methyl derivatives
with 2-methylene-3-oxoquinuclidine the authors synthesized 11,11a-dihydro-
10N-quinuclidino[2,3-c]1,5-benzdiazepine including its 7,8-dimethyl
derivative, reduced to 4a,5,11,11a-tetrahydro-10N-quinuclidino[2,3-c]

1,5-benzodiazepines. Pharmacological tests of the newly synthesized compounds showed them to be relatively inactive: they did not markedly affect the depressant effect of reserpine in white mice, and neither did they counteract the hyperthermic effect of phenamine and the hypothermic effect of L-DOPA and apomorphine. Only one of these newly synthesized derivatives of quinuclidine--4a,5,11,11a-tetrahydro-10N-quinuclidino [2,3-c]1,5benzodiazepine--did display elements of antidepressant activity (alleviation of the effect of reserpine, potentiation of the effect of 5-oxytryptophan). References 8: 4 Russian, 4 Western.

[48-1386]

USSR

UDC 615.281:547.722

SYNTHESIS AND BIOLOGICAL ACTIVITY OF DERIVATIVES OF 3-ARYLBENZOFURAN

Moscow KHMICO FARMATSEVTICHESKIY ZHURNAL in Russian No 8 1979 pp 39-45
manuscript received 20 Feb 79

GRINEV, A. N., ZOTOVA, S. A., MIKHAYLOVA, I. N., STOLYARCHUK, A. A., STEPANYUK, G. I., MATSAK, V. V., SIZOVA, T. N. and PERSHIN, G. N., Moscow, All-Union Scientific Research Chemico-Pharmaceutical Institute imeni S. Ordzhonikidze; vinnitsa Medical Institute imeni N. I. Pirogov

[Abstract] As part of a continuing investigation, the synthesis of various functional derivatives of 3-arylbenzofuran was carried out. Thirty-nine different derivative compounds were synthesized, and then tested in experiments on rats and mice. Of the compounds investigated, XXI (phenylvarbamate of 2-oxymethyl-3-phenyl-5-bromobenzofuran) was found to be nontoxic, while compounds XX (phenylcarbamate of 2-oxymethyl 3-phenyl-5-chlorobenzofuran), XXI, and XXVII (thiosemicarbazone of 2-formyl-3-phenyl-5-bromobenzofuran) produced an anti-arrhythmic effect on aconitine-injected rabbits. Some of the investigated compounds also displayed a fungistatic and bacteriostatic effect, in the latter case particularly when the chlorine atom was replaced with the bromine atom. References 7: 6 Russian, 1 Western.

[48-1386]

CSO: 1841

SYNTHESIS AND BIOLOGICAL ACTIVITY OF N-o-CARBOXYPHENYLAMIDES OF THE
/3-N¹-ARENESULFONYDRAZIDE OF OXALIC ACID

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 8 1979 pp 36-39
manuscript received 23 Jan 79

BEZUGLYY, P. A., CHERNYKH, V. P., DROGOVOZ, S. M., BEREZNYAKOVA, A. I.,
MAKURINA, V. I. and VORONINA, L. N., Khar'kov Pharmaceutical Institute

[Abstract] The synthesis and biological activity of o-carboxyphenylamides of the arenesulfohydrazide of oxalic acid (I) are described. (I) are synthesized by reacting arenesulfochlorides with the hydrazide of o-carboxy-oxanilic acid on using a 10% caustic soda solution as the HCl acceptor. The newly synthesized varieties of (I) represent preparations with a combined hypoglycemic and diuretic effect. Experiments on male white rats demonstrate that some of the (I) compounds surpass 33-62% in activity the conventional diuretic hypothiazide, while experiments on rabbits and white mice show that the hypoglycemic effect of the investigated compounds (dose 50 mg/kg) depends on the nature of the substitute introduced into the arenesulfonyl part of the molecule, and that most of the compounds (I) display a hypoglycemic activity similar to that of butamide, with the maximum effect manifesting itself toward the 8th hour after administration. The toxicity of compounds (I) is relatively low. Thus, the o-carboxyphenylamides of the arenesulfohydrazides of oxalic acid display a high diuretic activity along with hypoglycemic properties and a low toxicity. References 9: all Russian.

[48-1386]

THE EFFECT OF THE ANTI-COCCIN COMPOUND THIALKOXYCIDE ON THE ACTIVITY OF SOME CHOLINESTERASES

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 6 1979 pp 10-12
manuscript received 28 Nov 78

VOLONT, L. A., RUDAKOV, V. V., and NIKOL'SKAYA, Ye. B., Leningrad
Veterinary Institute

[Abstract] The compound thialkoxycide (TAC) is highly effective as a preventive measure and treatment for coccidiosis in chickens, geese, ducks, and other animals. The title study was carried out using solutions of 0.5 mg/l acetyl cholinesterase (ACE) from human erythrocytes and 0.025 mg/l butyrylcholinesterase (BCE) from horse serum. Each of these solutions was mixed with a NaCl solution, a substrate solution, and a TAC solution. The activity of the cholinesterases was determined by potentiometric titration. The relative activity of the inactivated ACE or BCE was calculated as a ratio of the initial rates of hydrolysis of the substrate under the effect of the inactivated ACE or BCE and under the effect of the control solution. A calculation of the inhibition constants-- $(0.29 \pm 0.06) \times 10^{-4}$ for ACE and $(1.24 \pm 0.003) \times 10^{-4}$ for BCE--indicates that ACE is more strongly inhibited by TAC than is BCE. References 7: 4 Russian, 3 Western.

[02]

NEW PSYCHOLOGICAL DRUGS (REVIEW). I. ANTI-DEPRESSANTS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 6, 1970 pp 19-29
manuscript received 24 Nov 78

MASHKOVSKIY, M. D., POLEZHAYEVA, A. I., and ANDREYEVA, N. I., All-Union Scientific Studies Chemical Pharmaceutical Institute imeni S. Ordzhonikidze, Moscow

[Abstract] A brief description is given of 40 drugs widely used to treat depression. Most of these are improved modifications of previously known compounds. One of the principle drugs is imipramin and related

compounds, having different substituents on the N atom. Other combinations of rings--saturated, unsaturated, and/or heterocyclic; 5- and 6-membered; condensed or non-condensed--have anti-depressant activity. The physiological behavior of many of these compounds stems from the inhibition of monoaminoxidase. A structure and brief description is given for each of the compounds considered. References 56: 5 Russian, 51 Western

[02]

USSR

UDC 615.849.1.015.25:547.653

SYNTHESIS AND RADIATION-SENSITIVITY OF S-SUBSTITUTED MERCAPTOETHYLAMINO-METHYLNAPHTHALENES AND BENZO-2,1,3-THIADIAZOLS

Moscow *KHIMIKO-FARMATSEVTICHESKIY ZHURNAL* in Russian No 6 1979 pp 33-41
manuscript received 7 Oct 78

SLAVACHEVSKAYA, N. M., TSEPOVA, N. S., STREL'NIKOV, Yu. Ye., and KIROVA, S. M., Leningrad

[Abstract] The synthesis of the benzo-2,1,3-thiadiazols was carried out. Fifteen compounds were prepared with various alkyl groups. Of the 15 thiadiazols, 10 showed an increased resistance to degradation by radiation. The activity of irradiated and non-treated materials was tested using mice. The substitution of a hydrogen atom for the amino group at the β -mercaptoethylamine and its substituted methylbenzo-2,1,3-thiadiazol radical did not reduce the radiation resistance as is observed, for example, in the cyclohexylalkyl derivatives. The substituted naphthalenes showed no evidence of radiation protection. Detailed syntheses and structural configurations are given. References 8: 7 Russian, 1 Western.

[02]

CSO: 1841

EVALUATION OF HERBICIDES ON FIELDS OF FRUIT-BEARING DOG ROSE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 6 1979 pp 76-80
manuscript received 3 Jan 79

STRELETS, V. D., BUKINA, N. V., and KOCHETKOV, V. P., A Union Scientific
Studies Institute of Medicinal Plants, Moscow Branch

[Abstract] Simazin destroys the majority of annual weeds; in addition, no residue was observed in the dog rose the first year after its application. However, it does have some drawbacks. Thus, a three-year experiment was undertaken of the compounds linuron, kloran, and karagard. Suites of 6 test plots (3m x 3m) and 2 controls, were set up and evaluated for three for the following parameters: the number and mass of weeds present; the number and length of shoots and the total growth of each dog rose plant; influence of the various herbicides on the winter survivability and density of shoots of the dog rose bushes; and the average fruit weight, its % pulp, % seed, and ascorbic acid content. No consistent trends were observed to indicate a ranking in the quality of the herbicide; however, they were all non-toxic to the dog rose, did not effect the quantity or quality of the fruit, and did not leave a measurable residue. References 3: Russian

[02]

CSO: 1841

USSR

UDC 534.8

INVESTIGATION OF ACOUSTIC AND RHEOLOGICAL PROPERTIES OF ED-16 EPOXY RESIN

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSSR, SERIYA FIZIKO-TEKHNIЧЕСКИХ, ХИМИЧЕСКИХ И GEOLOGICHESKIKH NAUK in Russian No 5 1979 pp 22-25 manuscript received 28 Mar 79

BERDYEV, A. A., ATAYEV, G., and KHEMAYEV, B., Physicotechnical Institute, Turkmen Academy of Sciences

[Abstract] ED-16 resin, which has a molecular weight of 486 kg/kmole, epoxy number $x_e = 17.77\%$ and refraction index $n_D^{20} = 1.5800-1.5810$, is one of the epoxy resins whose rheological parameters (density and shearing viscosity) change with change in epoxy number. Its acoustic and rheological properties were studied to gain information about relaxation processes in highly viscous fluids used in industry. Measurements were taken of the coefficient of extinction of sonic energy, rate of propagation of longitudinal and transverse sound at temperatures of 10 to 90°C. Maximum moduli of elasticity K_{xx} , K_{yy} and G_{xy} were determined as a function of temperature. Dispersion was found in ED-16 of rate of propagation of ultrasonic longitudinal and transverse waves that shows that this epoxy resin has a mechanism in common with many strongly viscous fluids, that is the basis of relaxation behavior of ED-16. A refined nonlocal diffusion theory expounded in 1966 is discussed. 3 figures; 2 Russian references.

[56-10,637]

USSR

UDC 677.494.745.32-96.021.12:541.183.12

ANION-EXCHANGE POLYACRYLONITRIL FIBERS WITH A POLYDIETHYLAMINOETHYL METHACRYLATE GRAFT

Moscow KHIMICHESKIYE VOLOKNA in Russian No 5 1975 pp 13-14 manuscript received 9 Nov 78

LYSENKO, A. A., YEFIMOVA, N. A., YEMETS, L. V. and VOL'F, L. A.

[Abstract] An ion exchange material which simultaneously contains weak and strong basic groups was prepared by the title grafting, followed by alkylation of the graft chains with epichlorohydrin or methyl iodide.

The reversible redox system titanium peroxide complex, polyacrylonitrile- Fe^{3+} -hydrazine was used to accomplish the graft copolymerization. Decrease in iron content decreased the oxidative destruction of the graft copolymers and prevented formation of appreciable amounts of the homopolymer. Conditions of the reaction are presented. The fiber is an efficient adsorbent of variable valence metallic ions, viz., Cu and Ni. Figures 3; references 2 (Russian).

[51-8586]

USSR.

UDC 677.4.014/017+677.4.004.14:678.067

FEATURES OF THE ACTION OF COMPONENTS OF THERMALLY REACTIVE BINDERS ON REINFORCING CHEMICAL FIBERS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 5 1975 pp 28-30 manuscript received 15 Aug 78

PEREPELKIN, K. Ye., ANDREYEV, A. A., ZARIN, A. V. and KUDRYAVTSEV, G. I.

[Abstract] The reinforcing chemical fibers tested were highly-stable, industrial fibers, viz., polyesters (PE), polyvinyl alcohols (PV), hydrated celluloses (HC), polyamides and polyheteroarylenes (PHA) and glass fibers (GF) (the latter for the sake of comparison). Epoxide binders were used to prepare compositional polymeric materials with the fibers. The volumetric reaction of the binders and the fiber properties are decreased in the order HC, PV, PE, PHA and GF. The chemical fibers vary in the degree of access by the binder; the type of binder should be selected to assure minimum plasticizing action on the fibers. Figures 4; references 21 (Russian).

[51-8586]

CSO: 1841

SYNTHESIS OF POLYETHYLENETEREPHTHALATE WITHOUT ADDITION OF CATALYSTS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 5 1975 pp 10-12 manuscript received 30 Aug 78

MIKHAYLOV, G. D., SHEVCHENKO, V. V., POLYAKOV, L. V. and CHEGOL'A, A. S.

[Abstract] It is noted that the use of Sb_2O_3 , GeO_2 and other metallic catalysts in the industrial production of polyethyleneterephthalate (PETP) has the disadvantages of discoloration of the product and decrease in viscosity of the polymer melt during handling. A trial synthesis of PETP was studied using ethylene glycol ester of terephthalic acid (TPA) and the corresponding fore-polymers (I and II) which does not use catalysts, in contrast to the use of the dimethylterephthalate stage of transesterification which requires catalysis. Conditions of the polycondensation are given. The basic premise of foregoing the addition of catalysts is the positive influence on the rate of the polycondensation of addition of reactive, bifunctional compounds. Such compounds (TPA and its diphenyl or dinaphthyl esters) react more rapidly with the carbo-2-hydroxyethoxy groups of PETP than the latter do with each other, and they combine to form ethylene glycol. Reaction rates are adequate. Figures 3; references 10: 3 Russian, 1 DDR patent, 6 Western.

[51-8586]

WET FORMATION PRODUCTION OF FTORLON, A TUBULAR FIBER

Moscow KHIMICHESKIYE VOLOKNA in Russian No 5 1975 pp 15-16 manuscript received 10 Nov 78

KOSTROV, Yu. A., IGNATENKO, T. I., BUDNITSKIY, G. A., VELIKANOVA, I. M. and VOLKOVA, V. G.

[Abstract] Ftorlon is an acetone-soluble copolymer used to prepare tubular chemical-resistant fibers by wet formation and subsequent stretching. The tubular fiber is formed in a water-acetone precipitation bath from a 20-22% acetone solution of the copolymer. The desired properties of the fibers are dictated by their ultimate usage, e. g., for gas and liquid microfiltration, or absorption of a gas through the fiber wall. The

properties are a function of the conditions employed in the wet formation and stretching. Formation conditions examined included acetone content and temperature of the precipitation bath, which have a critical effect on pore size and porosity. Stretching of the fiber in air at 20° or in glycerine at 130°C affects its air permeability, and porosity, which is graphically portrayed. Variations in conditions of manufacture are able to tailor make the desired fiber. Figures 2; references 4: 2 Russian, 2 Western.

[51-8586]

CSO: 1841

USSR

UDC 678.742.23.02:66-73

SAFETY OF LARGE PLANTS FOR THE PRODUCTION OF HIGH-PRESSURE POLYETHYLENE

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 24 No 4, 1979 pp 347-352

POLYAKOV, Z. N., Candidate in Technical Sciences and General Director of the Okhtinskiy "Plastpolimer" NPO [Scientific Production Association]

[Abstract] The production of high-pressure polyethylene involves a high degree of danger, caused by the features of the technology and the equipment used for the process. The most significant factors of the potential danger of this production process are discussed, along with technical solutions employed in the foreign and domestic industry for ensuring production safety. The two stages in the production of high-pressure polyethylene are quite different in the technology and equipment used; aspects of safety are discussed in terms of these two stages. At the first stage the polymer is synthesized, in which the polyethylene granulate--the raw material--is produced from ethylene; the second stage is the makeup stage, where the raw material is treated chemically and mechanically to produce commodity products. A description is given of the general synthesis process used worldwide and of the equipment employed. One difficult technical problem is release of heat of about 800 kcal/kg in the polymerization of ethylene. The two types of reactors currently used are described, i.e., the "ideal displacement" tubular reactors, in the form of a row of series-connected high-pressure tubes supplied with jackets through which the heat transfer agent circulates, and the "ideal mixing" autoclave reactors, in the form of cylindrical high-pressure vessels furnished with high-speed mixers. In equipment of the latter type there is practically no removal of heat through the wall of the shell, but all the reactor's heat is drawn off just because of heating of the reaction mixture from the initial to the maximum reaction temperature. These reactors require a pressure

of 250 to 300 kg/cm² less than that of tubular reactors. The makeup stage of the production process includes the operations of receiving and analyzing the granulate, blending individual batches with different types of mixers, obtaining polyethylene compositions with different functional additives, transporting the granulate between different production sections, and storing, packing and shipping the finished products. Key sources of potential danger in all these operations in both stages of production are delineated. Discussed individually are compressor units, polymerizing units and makeup units. Compressor units are considered the most dangerous sections of the production process, for the equipment and gas duct systems are subjected to both high pressure and vibration. The main reasons for emergency situations are vibrational loads, resulting in such phenomena as fatigue failure of the metal, especially at points of stress concentration, seal failure in partable joints and the failure of supporting structures for equipment and pipelines. The medium-pressure (100 to 400 kg/cm²) gas lines are the most dangerous, since accidents occur suddenly in them, whereas in high-pressure gas lines they are usually preceded by leaks which can be detected. Fluctuations in pressure, the cause of the trouble, are reduced by eliminating resonant vibrations by the selection of optimal dimensions for elements of gas line systems and by the installation of buffer tanks in the direct vicinity of sources of vibration, as well as by the proper selection of the hydrodynamic characteristics of compressor valves and the contours of gas ducts. Threaded connections are a major problem, and to solve this the ends of pipes are secured with special sleeve fittings and it has been suggested that soldered or permanent welded joints be used instead of threaded. The need for the proper design of gas line systems is stressed. Methods of protecting compressors from overloads and breakdowns are detailed. It is suggested that many safety problems can be solved by removing compressors to open areas. Isolated protected servicing areas with remote controls are recommended. Fireproof clothing is recommended for personnel. The problem of the safety of compressor units can best be solved by replacing piston compressors with centrifugal. These compressors are being produced by certain foreign firms, but it is not known when they will be put into industrial service. The hazardous nature of polymerizing units is due to the fact that the reactor and high-pressure separator are subject simultaneously to internal pressure and elevated temperature. Tubular reactors incur the additional problem of intensified fluctuations in pressure. In addition, polymerization is carried out at temperatures close to the thermal breakdown region for ethylene, which involves considerable release of heat. Overheating of the reaction mixture is highly possible in the case of malfunctioning of equipment or deviations from normal conditions. Improvements in equipment design are required. Studies on the proper distribution of stresses in equipment are needed. Heat strains must be compensated. Measures are required to limit the possible hazardous effects of accidental discharge. Safety problems involving makeup units are associated with the presence in the melt to be granulated and processed of residual ethylene and with the presence of

polyethylene dust, the latter of which is highly explosive. This dust collects on the walls of ducts in the process of pneumatic conveyance of granules. Sparks and electrostatic charges can result in an explosion. Different methods of evacuating the dust are used, including vacuuming and using water vapor. Air blasting can be utilized, but at great expense. The problem of dust formation remains basically unsolved, and protective measures have been limited chiefly to grounding equipment and ducts to protect from static electricity, and sometimes to humidifying the transporting air. The safety of makeup units can best be improved by improving the technology. One method suggested is to employ inert gases for pneumatic conveyance of the material, or air from which the oxygen has been removed. References 15: 4 Russian, 11 Western.

[39]

USSR

UDC [677.494.675:536.495].061.43.017.4

INFLUENCE OF THE LINEAR DENSITY OF INDIVIDUAL THREADS ON THE FATIGUE STRENGTH OF CORD

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1979 pp 38-39 manuscript received 2 Aug 78

SHEVLYAKOV, L. P.; BOVA, V. G., SERKOV, A. T., and YELCHINA, N. V.

[Abstract] A study was carried out to determine the properties of composite cords and threads to the linear stability of individual threads made of aromatic polyamides. Such material is used for reinforcing tires and industrial rubber. Parameters measured included linear density, rupture pressure, rupture elongation modulus of elasticity at 1% elongation, and relative rupture loading. The obtained data indicate a significant improvement in the fatigue life of cord threads for a decrease in the linear density of the individual threads. For example, a fourfold decrease in the linear density results in a fortyfold increase in the useful working life of the rubberized cord. Specific linear densities can also be recommended for the different types of applications of the rubberized cords. References 12: 10 Russian, 2 Western

[09]

CSO: 1841

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PREPARATION, PROPERTIES AND USES OF FIBERS HAVING ENZYMATIC ACTIVITY
(REVIEW)

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1979 pp 3-8 manuscript
received 9 Oct 78

VOL'F, L. A., SHAMOLINA, I. I., and KHOKHLOVA, V. A.

[Abstract] Immobilization of enzymes on solid surfaces leads to a significant increase in their stability. At the present time, there are three basic methods of preparing such enzyme-containing fibers: 1, introduction of the enzymes into the spinning solution, with their subsequent molding into the fibers; 2, the filling of hollow fibers with enzymes; 3, the attachment of the enzymes to the fibers with covalent chemical bonds. Factors influencing the preservation of enzymatic activity include pH, temperature, the quantity and distribution of the enzyme in the polymer molecule, and the nature of the polymer molecule itself. Various studies using trypsin are presented as examples. Such fibers containing immobilized enzymes can be sterilized using a 1-5 mrad dose of γ -radiation. The enzymes on the fiber are more useful than the dissolved solutions in that the fibers can be easily removed from the reaction mixture and they retain their reactivity longer. References 17: 13 Russian, 4 Western

[09]

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OPTIMIZATION OF THE DEHYDROGENATION OF ETHYLBENZENE INTO STYRENE IN THE
PRESENCE OF AIR OXYGEN

Baku AZERBAIJZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4, 1979 pp 13-17

ABILOV, A. G., ALIYAROV, R. I., ALIYEV, V. S., TER-SARKISOV, B. G. and
KHYDYROV, B. S., Institute of Petrochemical Processes

[Abstract] The dehydrogenation of ethylbenzene into styrene in the presence of atmospheric oxygen results in continuous recovery of the catalyst and intensifies the supply of heat for the endothermal reaction of dehydrogenation, thus markedly increasing the yield of styrene. Moreover the introduction of atmospheric oxygen into the batch assures

a relatively isothermal mode of the process. In this connection, formulas for optimizing this process by deriving the optimal factors (temperature of the reaction zone and the amount of charge in the adiabatic reactor), based on an investigation of the process kinetics, and including equations of kinetics and material balance, are presented. Allowance is made for technical-economic factors such as volume of output, price of product, production cost, and the cost of raw materials and overhead. It is established that the minimum production cost is reached when the annual output of styrene is 50,600 tons. References 7: all Russian.

[43-1386]

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MODIFICATION OF EPOXY RESINS WITH UNSATURATED OXYESTERS

Baku AZERBAYDZHANSKIY KHMICHESKIY ZHURNAL in Russian No 4 1979 pp 80-82

LYUBOV, G. M., MAMEDOVA, G. G., ABSULLAYEVA, I. S. and MAMEDOVA, L. G.,
Azerbaijdzhan Polytechnic Institute imeni Ch. Il'brym

[Abstract] The unsaturated oxyesters 1-benzoato-3-allyloxypropanol-2 (I) and 1-phenylaceto-3-allyloxy-propanol-2 (II), synthesized by condensing 1-chloro-3-allyloxypropanol-2 with salts of aromatic carboxylic acids, were tested for suitability as modifiers-diluents of ED-20 industrial epoxy resin. Their addition in proportions of 10-30% to ED-20 resin treated with PEPA (polyethylenepolyamine) hardener, resulted in the formation of epoxy compounds with improved and stable physico-mechanical properties, particularly as regards elasticity, high-temperature strength, and thermal deformation. The dielectric loss angle of the resulting compounds satisfies the technical requirements. Reference 1: Russian.

[43-1386]

CSO: 1841

DIEPOXYDIHYDRODICYCLOPENTADIENYL ESTERS OF NAPHTHENIC ACIDS AS PLASTICIZERS OF POLYVINYL CHLORIDE

Izuku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 4 1979 pp 67-79

ZEYNALOV, B.K., DADASHEVA, T. G., SULEYMANOVA, Z. G., ISKENDEROVA, S. A. and ALESKEROVA, O. M., Institute of Petrochemical Processes imeni Yu. G. Mamedaliyev, Azerb. SSR Academy of Sciences

[Abstract] Diepoxydihydrodicyclopentadienyl esters of naphthenic acids were synthesized by epoxydizing dihydrodicyclopentadienyl esters of naphthenic acids by means of peracetic acid, with the molar ratio between reactants being 1:2. The thus synthesized esters are high-b.p. oily yellowish fluids, odorless, insoluble in water, but soluble in organic solvents. The plasticizing properties of the thus synthesized esters cyclohexene and methylcyclohexene of naphthenic acids were tested on S-65 polyvinyl chloride (PVC) suspension. The test specimens had the composition (in parts by weight): PVC, 100; plasticizer, 40; calcium stearate, 1.0. The resulting compositions were carefully mixed and gelatinized at 70°C for 2 hr, and thereupon rolled at 140°C for 5-7 min. The thus obtained films were pressed at the same temperature and pressure, 150 kg/cm². Tests of these specimens showed their physical and strength properties to be superior to those of the PVC plastics based on using dioctylphthalate as the plasticizing agent. Figures 3: all Russian.

[43-1386]

CSO: 1841

UDC [668.472.66.061.4:634.0.866]:678

PRODUCTION OF EM-3 RESIN AND ITS USE IN AUTOMOBILE TIRE PRODUCTION AND RUBBER INDUSTRY ARTICLES

Moscow GIDROLIZNAYA I LESOKHIMICHESKAYA PROMYSHLENNOST' in Russian No 6, 1979 signed to press 22 Aug 79 pp 14-15

ZYKOVA, N. P., Senior Scientific Associate, ZAKHAROVA, T. V., Junior Scientific Associate, PARSHUKOV, A. A., Senior Engineer and POLUYKO, Ye. G., head of the Laboratory of the Central Scientific Research and Planning Institute of Wood Chemistry Industry

[Abstract] The Central Scientific Research and Planning Institute of Wood Chemistry Industry (TsNILKhI) has developed a technology for producing a new product (modified extraction resin) EM-3 with improved operational properties which can be substituted for wax resins in tire production in recipes by which 30-40% of this output is produced. Series production began in 1977 and automation of the process required granulated resin. Technology of production of granulated resin is described and the block diagram of this is presented. This process is recommended for industrial production. The use of this technological process provides savings of 1 million rubles per year in the Wood Chemistry Industry and with the use of granulated resin EM-3 this figure should increase. Figures: 2.

[23-2791]

UDC 678.4.065.001.2

PRESENT STATE AND PROSPECTS OF DEVELOPMENT OF TIRE PRODUCTION OPERATIONS FOR TRUCKS AND BUSES

Moscow KAUCHUK I REZINA in Russian No 9 1979 signed to press 5 Sep 79 pp 3-5

PRASHCHIKIN, V. N., Scientific Research Institute of the Tire Industry

[Abstract] A brief overview of experimental design operations over the last 15 years to develop different types of automobile and truck tires was presented. The importance of development of radial type tires was emphasized. Tables present specifications for radial and diagonal tires produced by the Soviet Industry for Automobiles and Trucks. A brief description of some of the needs and problems in tire production for the near future was presented.

[28-2791]

STUDY OF THE RELATIONSHIP BETWEEN MUNI (M) VISCOSITY AND PLASTICITY OF ISOPRENE RUBBERS

Moscow KAUCHUK I REZINA in Russian No 9 1979 submitted 3 Mar 77 signed to press 5 Sep 79 pp 6-7

SAFRONOVA, G. S., ZHAKOVA, V. G., KARMIN, B. K. and KOVALEV, N. F.,
Scientific Research Institute of the Tire Industry

[Abstract] The relationship between Muni viscosity (M) and plasticity of synthetic isoprene rubber (SKI), lithium-isoprene rubber (SKI-3) and natural rubber (ND) was depicted by a family of curves proceeding from a point with coordinates $M = 0$, $Pl-1$ and tending toward values $M = M_i$. Numerical differences of parameters M (Pl) and M ([h]) of the rubbers studied were found to be caused by their different cohesive strengths which depends on the molecular structure of the polymer chains and, with an increase of M_0 and M_{max} the rubbers fall into the sequence $NK > SKI-3 > SKIL$ and are found in the same sequence upon increase of intensity of breakdown during vulcanization. Quality control procedures for determination of the M, Pl relationship require determination of the values of M and Pl in the interval required. References: 8; Figures: 2.

[28-2791]

EFFECT OF PARAMETERS OF EXTRUSION ON ANISOTROPY OF PROPERTIES OF A BLOCK COPOLYMER OF BUTADIENE AND STYRENE

Moscow KAUCHUK I REZINA in Russian No 9 1979 submitted 2 Jan 79 signed to press 5 Sep 79 pp 19-22

IL'YAKOV, Ye. V., KULEZNEV, V. N., KRIVONOSOV, A. I. and ZOTKINA, I. V.,
All-Union Scientific Research Institute of Medical Polymers

[Abstract] Investigation of the change of anisotropy of properties of a block polymer of butadiene and styrene (DST-30) was determined by studying the effect of the rate of shift of the forming gap, the degree of drawing of the melt, the temperature of extrusion and the yield index of the melt on the degree of orientation and anisotropy of properties of the

block polymer, showed that structural orientation of DST-30 occurred under shear stress on the melt without tension loading. Tension caused a simultaneous increase in the melt of both molecular and structural orientation, while an increase of extrusion temperature and the yield index of the melt reduces both the structural and molecular orientation in it. It was proposed that anisotropy of properties of DST-30 extruded articles may be reduced by reducing the degree of drawing of the melt and increasing the fusion temperature. These methods were used to produce blood transfusion equipment with the capacity for self-sealing of punctures. References: 12; Figures: 3.

[28-2791]

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UDC 678.74.678.0131.678.043.6

INVESTIGATION OF THE SELENIUM-SULFUR VULCANIZATION OF BUTYL RUBBER

Baku AZERBAYDZHANSKIY KHIMICHESKIY JURNAL in Russian No 4 1979 pp 70-73

AKHMEDOV, G. G., SADYGOVE, Sh. F., MAMEDOV, M. M. and BABAYEV, R. Kh.,
Institute of Chloroorganic Syntheses, Azerb. SSR Academy of Sciences

[Abstract] The combined use of selenium and sulfur as vulcanizing agents with respect to butyl rubber was experimentally investigated. To this end, batches containing a fixed amount of selenium (1.0 part by weight) and a variable amount of sulfur (0.5 to 2.0 parts by weight) were vulcanized at 110 and 143°C for 10-80 min. It is established that in the process of the vulcanization of butyl rubber most of the selenium is consumed within the first 30 min, with the remainder being consumed in vulcanization process as functions of temperature is presented. The consumption of selenium was found to increase with increase in the proportion of sulfur in the batch; then also the degree of vulcanization, elasticity, and stress-rupture strength of the rubber correspondingly increased. Figure 1; references 6: all Russian.

[43-1386]

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